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AMBIENT AIR MONITORING MONTHLY DATA REPORT
PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
THREE CREEKS 842B STATION

JOB #: 8449-2017-11-80-C

November 2017

Prepared for:

PEACE RIVER AREA MONITORING PROGRAM COMMITTEE

Attention: LILY LIN

DATE: **December 19, 2017**

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SUMMARY

In November 2017, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Three Creeks 842b Station, near Peace River Oil Sands Area 2, Alberta. The monitoring station provides continuous meteorological measurements and air quality data for compliance parameters, as requested by the PRAMP Committee.

All data collected this month was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above the 90% requirement.

The daily zero/span schedule was reverted to a 23-hour interval on November 7, as per PRAMP's request.

SO₂: Eleven hours of downtime were recorded between November 20 and November 23 due to an additional zero/span check and quality activities performed to investigate a PMT temperature alarm.

TRS: Four hours of downtime were recorded this month due to additional quality checks performed to assess drifts in span response. One hour of data was discarded on November 23 at 19:00, as the analyzer was stabilizing towards ambient baseline concentrations, following an as-found response check.

THC/CH₄/NMHC: Nineteen hours of downtime were recorded this month.

- Seventeen hours of downtime were attributed to additional quality checks and analyzer replacement activities performed around the sporadic instances of low CH₄ concentrations, caused by poor sample injections. Thermo 55i (s/n: 1236656188) was removed on November 23 and Thermo 55i (s/n: 1505664392) was installed as a replacement.
- Minute data was corrected in order to exclude data impacted by poor injections. Two hours of data were lost as a result.

Canister System: One canister event was recorded on November 12 at 10:10, at an initial concentration of 0.40 ppm. The sample was collected by the local site contacts for analysis. This is, however, not considered a valid event as the 5-minute average concentration at this period no longer records above 0.30 ppm, following data validation.

The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0, Discussion. On this basis, Maxxam Analytics is issuing this completed report to Peace River Area Monitoring Program Committee, Three Creeks 842b Station.

Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-219-3677 or toll-free at 1-800-386-7247.

Monthly Continuous Data Summary

Peace River Area Monitoring Program Committee						MAXIMUM VALUES							OPERATIONAL TIME (%)
Three Creeks 842b Station						1-HOUR				24-HOUR			
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO ₂ (ppb)	172	48	0	0	0	3	9	9	8.6	ESE	1	9	98.5
TRS (ppb)	-	-	-	-	0.18	0.50	6	19	2.4	NW	0.23	27	99.3
THC (ppm)	-	-	-	-	2.01	2.22	3	3	3.2	ESE	2.08	9	97.4
CH ₄ (ppm)	-	-	-	-	2.01	2.22	3	4	2.3	E	2.08	9	97.4
NMHC (ppm)	-	-	-	-	0.00	0.02	10	7	0.9	NNW	0.00	1	97.4
RELATIVE HUMIDITY (%)	-	-	-	-	82	96	23	22	4.1	NNW	90	13	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	940	960	2	18	4.1	NNW	958	2	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-10.7	3.5	23	10	15.5	SW	0.8	23	100.0
STATION TEMPERATURE (°C)	-	-	-	-	21.5	23.2	23	13	13.8	WNW	22.7	26	100.0
VECTOR WS (kph)	-	-	-	-	1.1	22.2	29	22	-	SW	12.7	29	100.0
VECTOR WD (sec)	-	-	-	-	213 (SSW)	-	-	-	-	-	-	-	100.0

**SOUR GAS PROCESSING INDUSTRY
MONTHLY REPORT SUMMARY**

Three Creeks 842b Station

Peace River Area Monitoring Program Committee

Plant Name / Location

Company

Licence Number	Report Date	
	YEAR	MONTH
N/A	2017	November

CONTINUOUS AMBIENT MONITORING						
PARAMETER	% TIME OPERATIONAL	ONE - HOUR AVERAGE			24 - HOUR AVERAGE	
		MAXIMUM VALUES	NO. READINGS > REGULATION	MAXIMUM VALUES	NO. READINGS > REGULATION	
SO ₂	98.5	0.003 ppm	0	0.001 ppm	0	
TRS	99.3	0.001 ppm	-	0.000 ppm	-	
THC	97.4	2.22 ppm	-	2.08 ppm	-	
CH ₄	97.4	2.22 ppm	-	2.08 ppm	-	
NMHC	97.4	0.02 ppm	-	0.00 ppm	-	
RH	100.0	96 %	-	90 %	-	
BP	100.0	960 mb	-	958 mb	-	
Ambient TPX	100.0	3.5 °C	-	0.8 °C	-	
Station TPX	100.0	23.2 °C	-	22.7 °C	-	
Wind Speed	100.0	22.2 kph	-	12.7 kph	-	
Wind Direction	100.0	-	-	-	-	

SIGNATURE OF COMPANY REPRESENTATIVE

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Exceedance Summary Report

SO₂ 1-Hour Exceedances

Measured concentrations of sulphur dioxide were below the 1-hour AAAQO of 172 ppb.

SO₂ 24-Hour Exceedances

Measured concentrations of sulphur dioxide were below the 24-hour AAAQO of 48.0 ppb.

In accordance with EPEA and the Substance Release Regulation.

In accordance with A Guide to Release Reporting and the Alberta Ambient Air Quality Objectives and Guidelines Summary.

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1.0 Discussion

This monthly report consists of continuous monitoring results for the following parameters: Sulphur Dioxide (SO₂), Total Reduced Sulphur (TRS), Total Hydrocarbon (THC), Methane (CH₄), Non-Methane Hydrocarbon (NMHC), Relative Humidity (RH), Barometric Pressure (BP), Ambient Temperature (AmbTPX), Station Temperature (StnTPX), Wind Speed (WS) and Wind Direction (WD).

The sample inlet filter for all continuous air analyzers are replaced before the calibration begins. The sample manifold is cleaned during the site visit each month.

Control checks, consisting of a zero and span, are conducted daily on all continuous air monitors. In place of the air sample, zero air (from scrubbed air or gas cylinders) is used for zero checks, and a known concentration of the pollutant being analyzed is used for span checks. These checks are controlled by automatic timers and valves. The total zero span cycle is completed within an hour, the commencement of the zero span cycle is at the beginning of the hour.

Multipoint calibrations are done a minimum of once a month for each continuous air monitor. An additional calibration is required under the following conditions: 1) within three days after the initial start-up and stabilization of a newly installed instrument, 2) prior to shut-down or moving of an instrument which has been working to specification, and 3) when major repair has been done on the instrument.

Time during the first multi-point calibration is not considered downtime (Data is flagged as C). If more than one calibration is performed during the month, the time during the additional calibration is considered as downtime (Data is flagged as C1).

Only one zero/span check is run per day. Time during the zero/span check is not considered as downtime (Data is flagged as S). If an extra zero/span check is performed, the time during the additional check is considered as downtime (Data is flagged as S1).

The AMD requires each instrument and accompanying data recording system to be operational 90% of the time, at a minimum, for each monthly monitoring period.

All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.

Data contained in this monthly report has undergone the verification and validation based on the requirements of the AMD Chapter 6: [Ambient Data Quality \(December, 2016\)](#). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction. The minimum and maximum statistics are highlighted in the data table and are for reference only. The highlighted cells are based on the software's interpretation of the exact position of the minimum or maximum value. The visual presentation of these statistics may not be the obvious choice in a data range due to rounding, truncating or analyzer specifications.

Hourly/minute data have been reviewed based on daily zero/span results and multi-point calibration results. Data may be considered invalid if a zero-corrected span check in excess of +/- 10% of the span concentration (established by the previous multi-point calibration) is encountered and/or significant differences in the calibration factor occurs (greater than 10%).

SULPHUR DIOXIDE (SO₂)

- Operational time, for the monitoring period was 98.5%, equivalent to eleven hours of downtime.
- The routine monthly calibration was performed on November 7.
- The analyzer spanned towards the upper acceptance limit on November 19. A repeat zero/span check was completed on November 20 and the results did not show a trending drift. However as a precaution, an as-found response check was scheduled. During the as-found response check on November 23, a PMT temperature alarm was observed. A shut-down calibration was therefore completed in order to investigate the issue. The PMT fan was changed and the UV lamp was calibrated. A post-repair calibration was subsequently performed. As the shut-down calibration met AMD requirements, no data was discarded due to this event. Eleven hours of downtime were, however, recorded due to the additional quality checks.

TOTAL REDUCED SULPHUR (TRS)

- Operational time, for the monitoring period was 99.3%, equivalent to five hours of downtime.
- The analyzer spanned towards the lower acceptance limit on November 3. A repeat zero/span check was completed later that day and the results did not show a trending drift. One hour of downtime was recorded due to the additional quality check.
- The routine monthly calibration was performed on November 7.
- The analyzer spanned towards the upper acceptance limit on November 23. A repeat zero/span check was completed later that day and the results did not show a trending drift. However as a precaution, an as-found response check was completed on the same day. The results met AMD requirements. Data collected at hour 19:00, immediately after the as-found response check, was excluded as the analyzer was stabilizing towards ambient baseline concentrations. Four hours of downtime were recorded due to this event.

TOTAL HYDROCARBONS (THC), METHANE (CH₄) and NON-METHANE HYDROCARBONS (NMHC)

- Operational time, for the monitoring period was 97.4%, equivalent to nineteen hours of downtime.
- The routine monthly calibration was performed on November 7.
- The sporadic instances of low CH₄ concentrations observed in October, attributed to poor sample injections, continued into November. Following a successful shut-down calibration on November 17, troubleshooting/maintenance was performed in an attempt to fix the injection problem. The actuator, which had recently been replaced, was realigned and the column chamber fittings were checked and tightened. A successful post-repair calibration was subsequently completed. However, the analyzer continued to record poor sample injections. It was decided that the analyzer be replaced for off-site maintenance. On November 23, following a successful shut-down calibration, the analyzer (Thermo 55i, s/n: 1236656188) was removed. A replacement (Thermo 55i, s/n: 1505664392) was subsequently installed, followed by a successful installation calibration. Seventeen hours of downtime were recorded due to these additional quality activities.
- Based on historical data and Maxxam's internal guidelines, CH₄ concentrations ≤ 1.80 ppm were considered poor injections. Between November 1 and November 23 (when the analyzer was replaced), impacted CH₄ minutes, along with the corresponding THC and NMHC values, were excluded and the corresponding hourly averages were re-calculated. Hourly data with more than fifteen invalid minutes were discarded as per AMD requirement. Two hours of data collected on November 12 at hour 09:00 (09:00-10:00 for maximum instantaneous data), and November 15 at hour 18:00, were invalidated as a result.

TOTAL HYDROCARBONS (THC), METHANE (CH₄) and NON-METHANE HYDROCARBONS (NMHC) cont'd

• The canister sampler is programmed to draw in a whole air sample when the 5-minute average concentration of NMHC is above 0.30 ppm. A representative sample of ambient air is collected over a one-hour period when the canister event is triggered. One canister event was recorded on November 12 at 10:10, at a concentration of 0.4 ppm. The sample was collected by the local site contacts for analysis. However, following the minute data correction as explained above, the 5-minute average concentration at 10:10 on November 12 no longer records above 0.3 ppm, as it had been recalculated. This is, therefore, not considered a valid event.

WIND SPEED (WS) and WIND DIRECTION (WD)

- Operational time, for the monitoring period, was 100%.
- Wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing from and is measured in degrees from true north.

RELATIVE HUMIDITY (RH)

- Operational time, for the monitoring period, was 100%.

BAROMETRIC PRESSURE (BP)

- Operational time, for the monitoring period, was 100%.

AMBIENT TEMPERATURE (AmbTPX)

- Operational time, for the monitoring period, was 100%.

STATION TEMPERATURE (StnTPX)

- Operational time, for the monitoring period, was 100%.

2.0 Project Personnel

Karla Reesor was the contact for Peace River Area Monitoring Program Committee and the Maxxam field technicians were Christopher Wesson and Limin Li.

3.0 Plant Monthly Required AMD Summary

All data collected this month was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above the 90% requirement.

4.0 Calculations and Results

All calculations and reporting of results follow the methods described in the AMD, 2016.

5.0 Methods and Procedures

The following methods and procedures were used to complete the monitoring program:

Maxxam AIR SOP-00001: Methane, Non-Methane Hydrocarbon Analyzer Monitoring

Maxxam AIR SOP-00208: RM Young Wind Monitor Calibration

Maxxam AIR SOP-00209: Ambient Sulphur Monitoring

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

Sulphur Dioxide - API 100A UV Fluorescent Analyzer

Total Reduced Sulphur - Thermo 43i - TLE UV Fluorescent Analyzer

Methane, Non-Methane Hydrocarbon - Thermo 55i FID Analyzer

Wind System - RM Young Unit

Relative Humidity - RM Young Unit

Barometric Pressure - Met One Unit

Ambient Temperature - RM Young Unit

Datalogger - ESC 8832

The following steps were used to complete the data verification and validation process:

Level 0 Preliminary Verification

Level 0 data are raw data obtained directly from the data acquisition system (DAS). Under the step of Level 0, these data undergo a certain amount of manual or automated screening and flagging. It included a) identification of periods of missing data; b) verification of time stamps against reference time; c) verification that instrument diagnostics/datalogger flags indicate normal operation; d) comparison of data to upper and lower limits; e) rate of change flagging indicating that data changed too rapidly or not at all; and f) verification that zero, span and multipoint performance checks are within specifications. This level of verification is performed on a daily basis.

Level 1 Primary Validation

Validation actions under the step of Level 1 include a) review of all screening flags assigned during preliminary verification; b) review of all supporting site information and documentation; c) review of operational acceptance limits for each parameter/analyzer; d) review of daily zero/span and monthly calibration results for all gaseous parameters; and e) application of any necessary adjustments to data (e.g. baseline adjustments, below zero adjustments). This level of validation is performed on a monthly basis.

Level 2 Final Validation

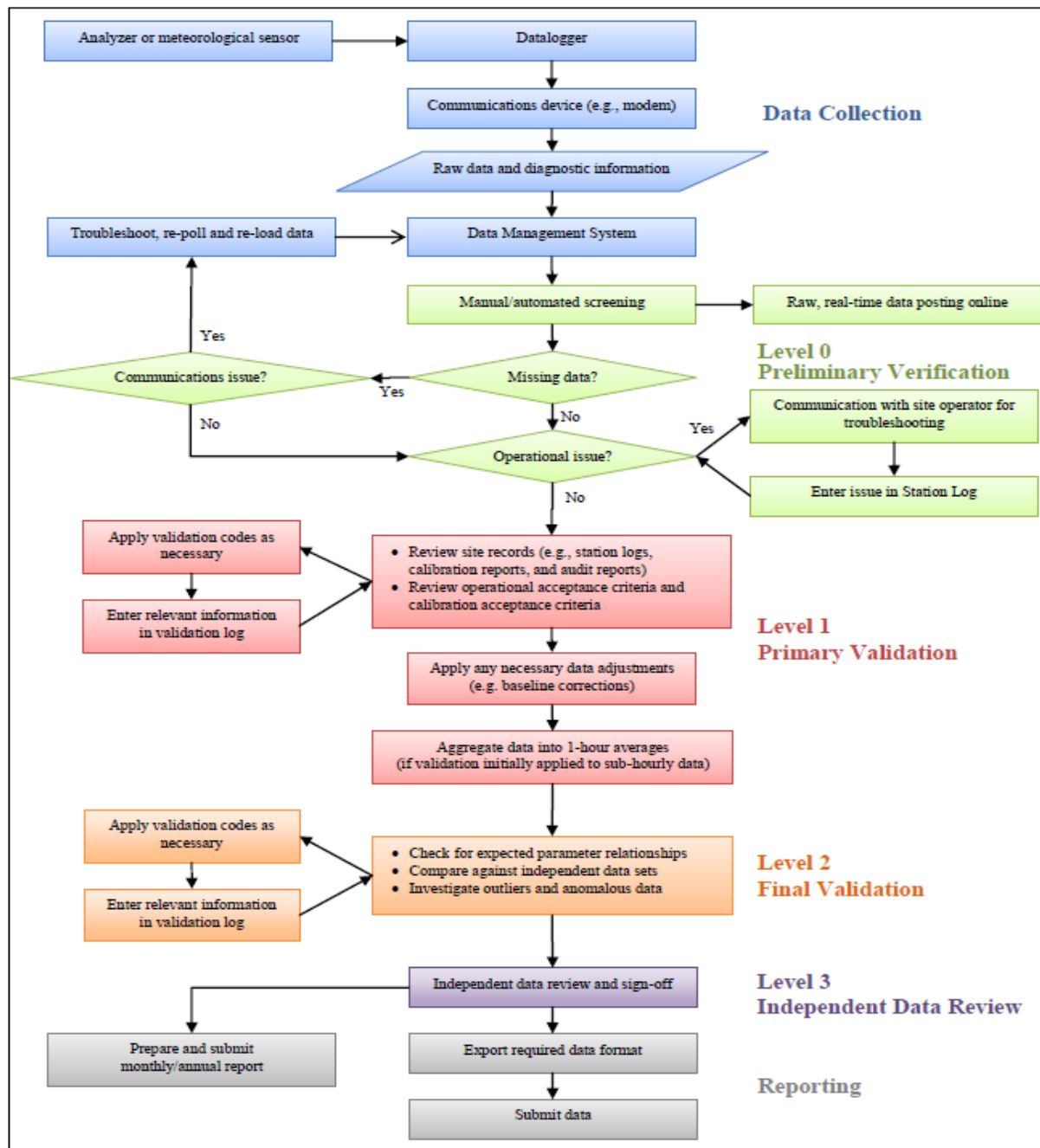
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

Level 3 Independent Data Review

Level 3 validation is the last step of data review, and it is completed by an individual that is independent of both field operations and primary data validation. A final independent QA review and endorsement is performed during this step before data is submitted to Alberta Environment.

Post-Final Validation

The Post-Final Validation step serves to re-evaluate the data that errors or omissions are discovered and/or suspected after the initial submittal of data. Any data issues or patterns which were not clear on a monthly basis are highlighted during this step. This validation is performed on an annual basis.



Source: Air Monitoring Directive (December 2016), Chapter 6, Ambient Data Quality; Figure 1 Data Collection and Management Process Flow Chart

APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE



SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
2	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
3	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
4	0	0	0	0	0	S	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
5	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
6	0	0	0	0	0	S	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	24
7	0	0	0	0	S	0	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	24
8	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
9	0	0	S	0	0	0	0	0	0	3	3	2	2	1	1	1	1	0	0	0	0	0	0	0	0	3	1	24
10	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
11	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	S	0	0	0	24
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	24
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	24
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	24
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	24
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	24
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	24
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	24
20	0	0	0	0	0	0	S1	S1	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	22
21	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	24
22	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
23	0	0	0	0	0	0	0	0	0	0	C1	C1	C1	Y	C1	C1	C1	C1	C1	0	0	0	0	0	0	0	0	15
24	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
25	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
26	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
27	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
28	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
29	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
30	0	0	0	0	S	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24
HOURLY MAX	0	0	0	0	0	0	0	0	0	3	3	2	2	1	1	1	1	0	0	0	0	0	0	0				
HOURLY AVG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

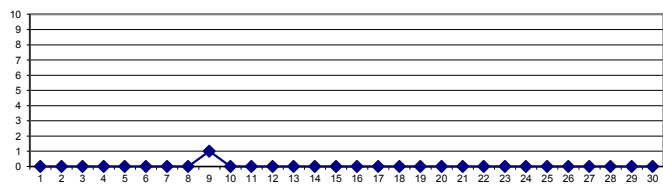
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	172	ppb	24-HR	48	ppb
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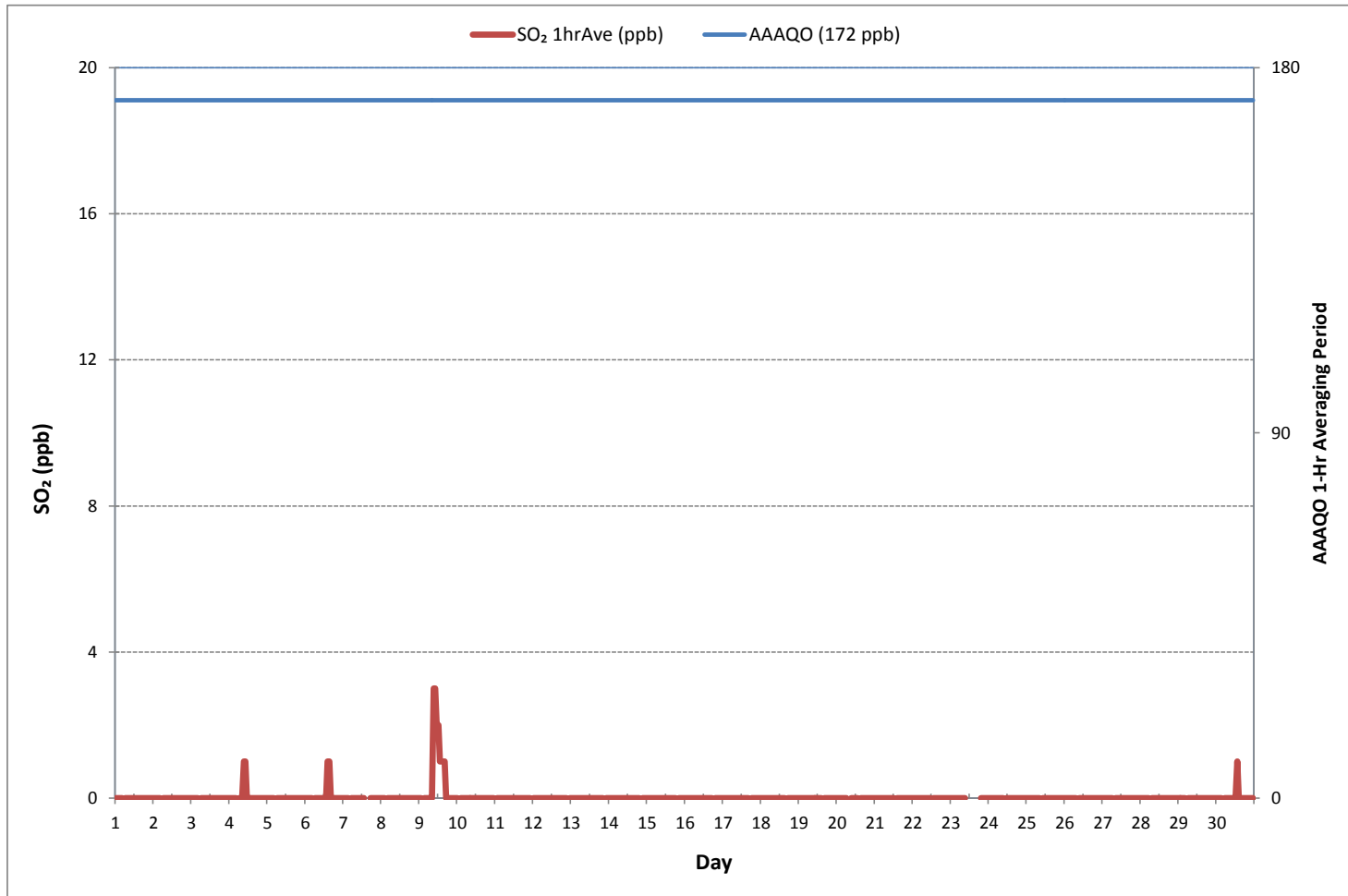
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	13
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR 0 ON DAY 1
MAXIMUM 1-HR AVERAGE:	3 ppb @ HOUR 9 ON DAY 9
MAXIMUM 24-HR AVERAGE:	1 ppb ON DAY 9
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	3 hrs
OPERATIONAL TIME:	709 hrs
AMD OPERATION UPTIME:	98.5 %
STANDARD DEVIATION:	0
MONTHLY AVERAGE:	0 ppb

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)





PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59						
DAY 1	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24		
2	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24		
3	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24		
4	0	0	0	1	1	S	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	24		
5	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24		
6	0	0	0	0	0	S	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0	24		
7	0	0	0	0	S	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	1	0	0	0	1	0	24		
8	1	0	1	S	1	1	0	0	1	0	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	24	
9	0	1	S	1	0	1	0	1	2	4	4	3	3	2	3	2	3	1	1	1	1	1	0	1	0	4	2	24		
10	1	S	0	0	0	1	1	0	0	1	1	1	0	1	1	1	0	1	0	1	0	1	1	1	1	0	1	1	24	
11	S	0	0	1	0	0	1	1	0	1	0	1	1	1	0	0	0	0	0	1	1	1	1	1	S	0	1	1	24	
12	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	S	1	0	1	1	24	
13	1	0	0	1	0	1	0	1	1	0	1	1	0	1	0	1	1	1	0	1	1	0	1	S	1	1	0	1	1	24
14	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	S	1	1	1	0	1	1	24
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	0	0	1	1	24	
16	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	S	1	1	1	1	0	0	1	1	24	
17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	S	1	1	1	1	1	1	1	0	1	1	24	
18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	24	
19	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	2	1	24
20	1	1	1	1	1	1	1	S1	S1	1	1	1	1	1	S	1	1	1	1	1	1	1	0	1	1	0	1	1	22	
21	1	0	1	1	0	0	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	0	1	1	24	
22	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
23	1	1	1	1	1	1	1	1	1	1	C1	C1	C1	Y	C1	C1	C1	C1	C1	2	1	1	1	1	1	1	2	1	15	
24	1	1	2	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	24	
25	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
26	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
27	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
28	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
29	1	1	1	1	2	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	24	
30	1	1	1	1	S	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
HOURLY MAX	1	1	2	1	2	1	1	2	2	4	4	3	3	2	3	2	3	1	1	2	1	1	1	1	1	1	1	1	24	
HOURLY AVG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	

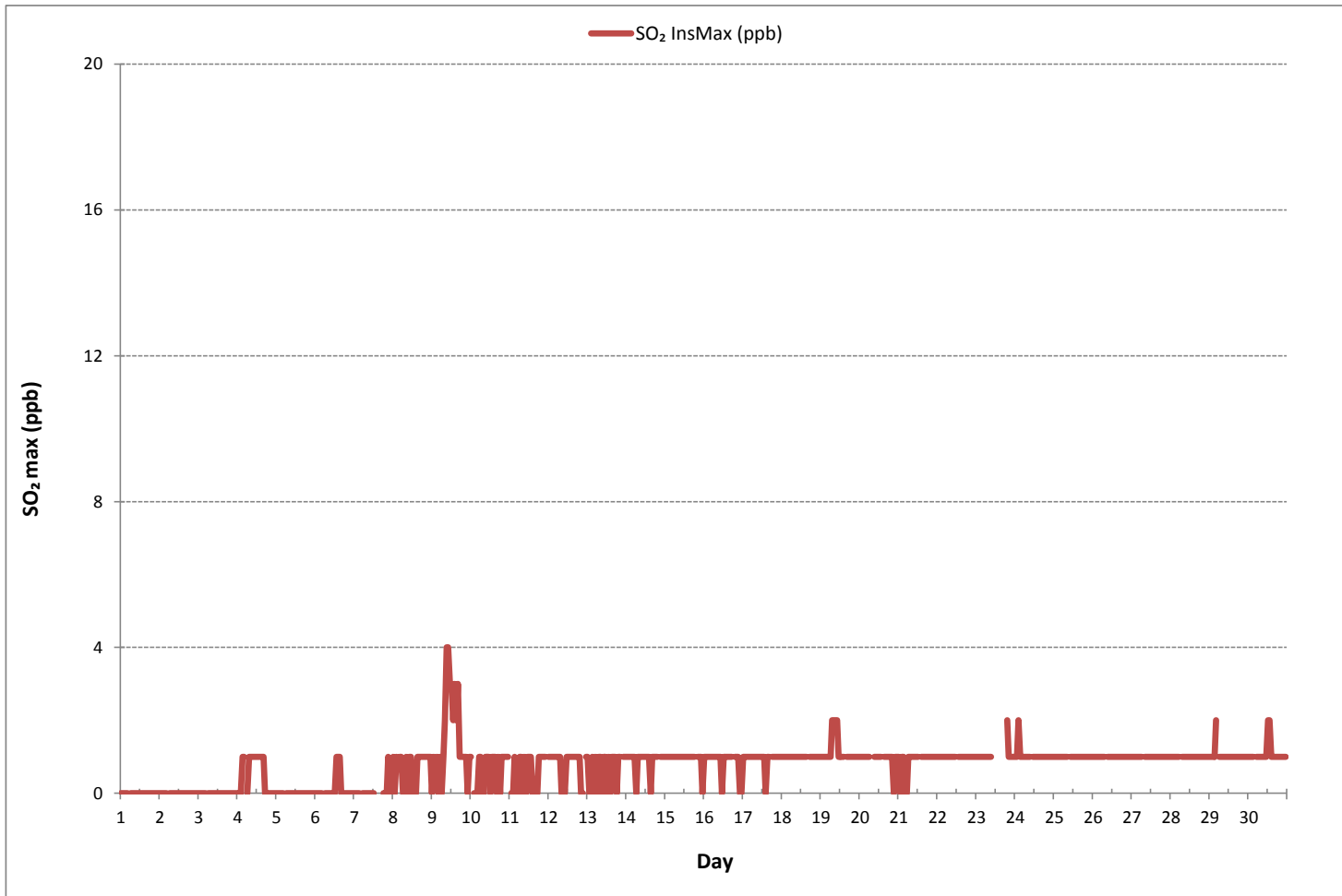
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	481
MAXIMUM INSTANTANEOUS VALUE:	4 ppb @ HOUR 9 ON DAY 9
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	1
OPERATIONAL TIME:	709 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)



Wind: PRAMP_842
 Poll.: PRAMP_842-SO₂[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

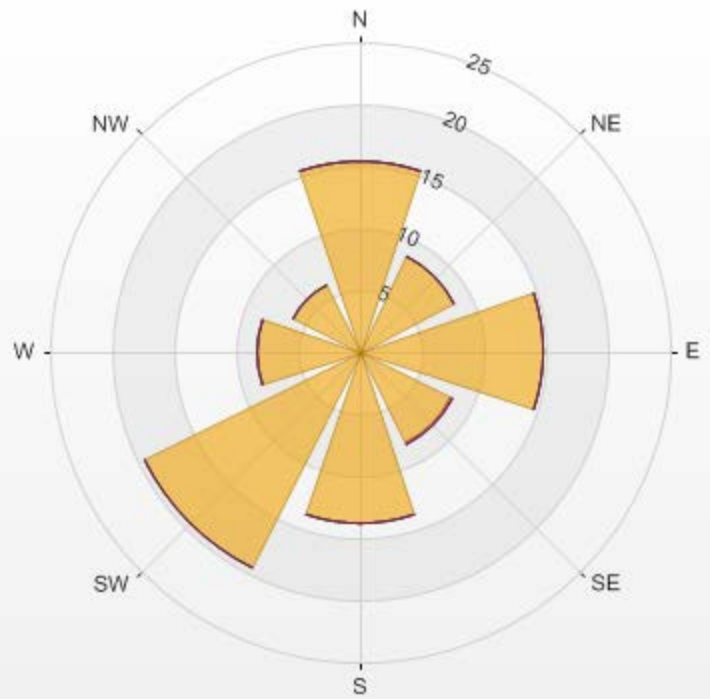
Calm: 5.19%

Calm Avg: 0.03 [ppb]

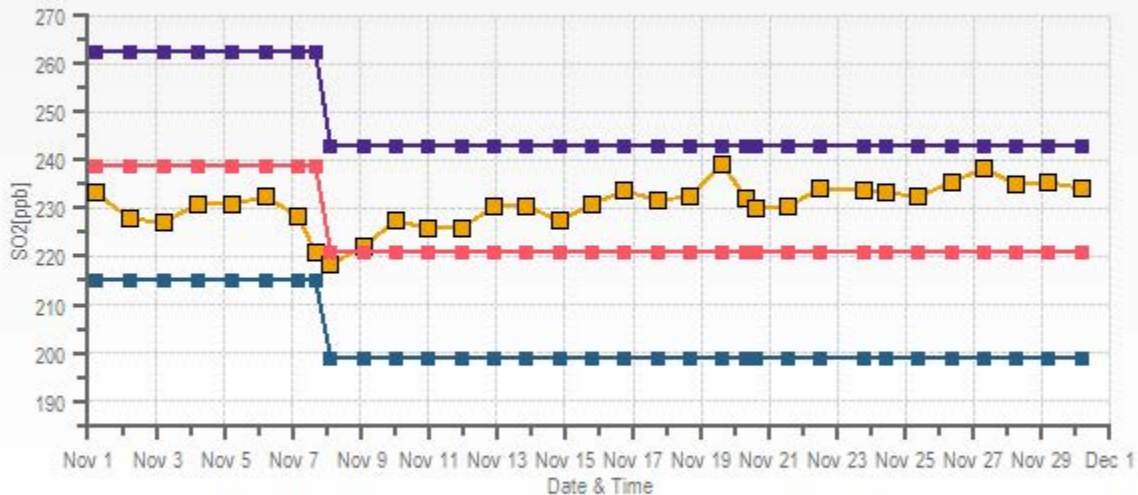
Direction	0-3	3-10	10-85	85-170	>170.0	Total
N	15.4	0.0	0.0	0.0	0.0	15.4
NE	8.6	0.0	0.0	0.0	0.0	8.6
E	14.8	0.0	0.0	0.0	0.0	14.8
SE	8.2	0.2	0.0	0.0	0.0	8.3
S	13.8	0.0	0.0	0.0	0.0	13.8
SW	19.4	0.0	0.0	0.0	0.0	19.4
W	8.3	0.0	0.0	0.0	0.0	8.3
NW	6.1	0.0	0.0	0.0	0.0	6.1
Summary	94.7	0.2	0.0	0.0	0.0	94.8

% Icon Classes (ppb) 95 0-3 0 3-10 0 10-85 0 85-170 0 >170.0

PRAMP_842 Poll.: PRAMP_842-SO2[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 5.19% Calm Poll Avg: 0.03[ppb]



SO2[ppb] Calibration: PRAMP_842 Monthly: 17/11 Type: Span



—■— Span Meas —■— Span Ref —■— Span Low —■— Span High

TOTAL REDUCED SULPHUR



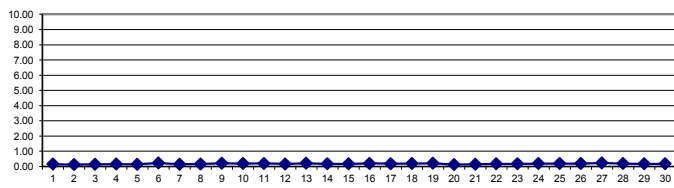
TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	0.16	0.14	0.15	0.15	0.15	S	0.19	0.16	0.18	0.16	0.15	0.17	0.15	0.15	0.15	0.14	0.14	0.15	0.14	0.16	0.13	0.15	0.16	0.12	0.12	0.19	0.15	24	
2	0.12	0.10	0.11	0.10	0.11	S	0.14	0.11	0.11	0.11	0.13	0.13	0.12	0.11	0.13	0.12	0.13	0.13	0.12	0.13	0.12	0.13	0.12	0.11	0.09	0.09	0.14	24	
3	0.09	0.10	0.11	0.13	0.14	S	S1	0.39	0.16	0.15	0.13	0.13	0.13	0.14	0.13	0.12	0.13	0.14	0.12	0.13	0.13	0.14	0.18	0.15	0.09	0.39	0.14	23	
4	0.16	0.14	0.15	0.15	0.16	S	0.19	0.14	0.14	0.15	0.15	0.16	0.14	0.15	0.14	0.15	0.15	0.15	0.15	0.17	0.17	0.17	0.16	0.16	0.14	0.19	0.15	24	
5	0.18	0.17	0.18	0.15	0.15	S	0.17	0.14	0.15	0.13	0.13	0.12	0.12	0.14	0.12	0.14	0.15	0.13	0.13	0.15	0.15	0.15	0.14	0.14	0.16	0.12	0.18	24	
6	0.20	0.18	0.20	0.19	0.19	S	0.25	0.19	0.19	0.17	0.18	0.17	0.17	0.18	0.18	0.18	0.19	0.18	0.31	0.50	0.42	0.30	0.23	0.18	0.17	0.50	0.22	24	
7	0.16	0.16	0.15	0.15	S	0.18	0.18	0.17	0.17	0.17	0.19	C	C	C	C	0.33	0.10	0.10	0.09	0.09	0.10	0.08	0.10	0.11	0.08	0.33	0.15	24	
8	0.13	0.13	0.12	S	0.18	0.16	0.12	0.12	0.13	0.14	0.16	0.16	0.15	0.15	0.16	0.17	0.20	0.21	0.20	0.18	0.16	0.18	0.16	0.16	0.12	0.21	0.16	24	
9	0.15	0.19	S	0.23	0.18	0.18	0.17	0.17	0.18	0.19	0.21	0.20	0.24	0.22	0.23	0.24	0.28	0.23	0.24	0.24	0.26	0.25	0.22	0.21	0.15	0.28	0.21	24	
10	0.21	S	0.25	0.20	0.22	0.25	0.24	0.22	0.18	0.18	0.20	0.18	0.20	0.20	0.18	0.18	0.18	0.15	0.17	0.17	0.18	0.18	0.18	0.19	0.15	0.25	0.20	24	
11	S	0.22	0.22	0.21	0.23	0.25	0.26	0.25	0.19	0.18	0.21	0.22	0.22	0.19	0.18	0.19	0.19	0.18	0.17	0.17	0.17	0.16	0.15	S	0.15	0.26	0.20	24	
12	0.20	0.17	0.16	0.16	0.16	0.18	0.17	0.17	0.17	0.16	0.16	0.17	0.17	0.15	0.16	0.15	0.15	0.16	0.14	0.15	0.17	0.16	S	0.19	0.14	0.20	0.16	24	
13	0.20	0.22	0.24	0.25	0.23	0.23	0.25	0.25	0.26	0.27	0.24	0.25	0.21	0.21	0.17	0.18	0.18	0.18	0.18	0.20	0.18	S	0.22	0.20	0.17	0.27	0.22	24	
14	0.19	0.19	0.20	0.20	0.19	0.20	0.17	0.19	0.19	0.19	0.18	0.18	0.17	0.17	0.15	0.15	0.15	0.15	0.14	0.14	S	0.19	0.18	0.17	0.14	0.20	0.18	24	
15	0.18	0.18	0.18	0.18	0.18	0.17	0.16	0.16	0.16	0.15	0.16	0.16	0.16	0.16	0.17	0.16	0.16	0.18	0.18	S	0.21	0.20	0.18	0.15	0.15	0.21	0.17	24	
16	0.19	0.21	0.23	0.24	0.19	0.18	0.19	0.19	0.20	0.17	0.17	0.17	0.19	0.16	0.19	0.19	0.21	0.20	S	0.28	0.21	0.20	0.20	0.22	0.16	0.28	0.20	24	
17	0.21	0.22	0.20	0.19	0.18	0.19	0.17	0.15	0.16	0.15	0.16	0.20	0.20	0.19	0.21	0.20	0.20	S	0.26	0.17	0.16	0.17	0.15	0.16	0.15	0.26	0.18	24	
18	0.15	0.16	0.16	0.16	0.17	0.16	0.16	0.16	0.15	0.16	0.17	0.17	0.19	0.19	0.19	0.22	S	0.25	0.27	0.25	0.20	0.20	0.20	0.18	0.15	0.27	0.19	24	
19	0.19	0.16	0.16	0.16	0.18	0.16	0.17	0.23	0.31	0.34	0.34	0.34	0.30	0.27	0.25	S	0.24	0.18	0.19	0.21	0.18	0.17	0.16	0.14	0.14	0.34	0.22	24	
20	0.11	0.11	0.11	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.12	0.11	0.10	S	0.19	0.14	0.13	0.13	0.14	0.14	0.13	0.14	0.15	0.10	0.19	0.12	24	
21	0.16	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.16	0.13	0.13	0.14	S	0.19	0.18	0.14	0.15	0.14	0.15	0.13	0.14	0.16	0.17	0.13	0.19	0.15	24	
22	0.18	0.17	0.19	0.17	0.18	0.16	0.16	0.15	0.16	0.20	0.19	0.17	S	0.23	0.21	0.19	0.18	0.15	0.16	0.17	0.15	0.15	0.15	0.16	0.15	0.23	0.17	24	
23	0.16	0.15	0.12	0.13	0.17	0.16	0.15	0.19	0.17	0.14	0.13	S	0.22	S1	0.23	0.17	0.18	C1	C1	X	0.20	0.18	0.17	0.21	0.12	0.23	0.17	20	
24	0.21	0.22	0.22	0.18	0.18	0.18	0.19	0.20	0.18	0.17	S	0.26	0.22	0.18	0.18	0.16	0.17	0.17	0.18	0.17	0.17	0.17	0.17	0.20	0.22	0.16	0.26	0.19	24
25	0.20	0.16	0.17	0.18	0.21	0.23	0.19	0.18	0.18	S	0.22	0.20	0.19	0.18	0.18	0.18	0.18	0.18	0.20	0.19	0.19	0.19	0.19	0.23	0.22	0.16	0.23	0.19	24
26	0.20	0.22	0.20	0.20	0.21	0.19	0.21	0.20	S	0.26	0.22	0.20	0.20	0.19	0.18	0.18	0.18	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.17	0.26	0.20	24
27	0.21	0.23	0.20	0.20	0.19	0.21	0.20	S	0.26	0.22	0.22	0.27	0.28	0.28	0.29	0.28	0.24	0.21	0.21	0.21	0.23	0.21	0.21	0.22	0.19	0.29	0.23	24	
28	0.23	0.23	0.23	0.24	0.24	0.20	S	0.21	0.17	0.19	0.19	0.20	0.17	0.16	0.15	0.13	0.16	0.17	0.18	0.18	0.19	0.18	0.17	0.18	0.13	0.24	0.19	24	
29	0.17	0.17	0.19	0.18	0.16	S	0.19	0.16	0.16	0.17	0.18	0.16	0.17	0.17	0.14	0.17	0.19	0.17	0.18	0.18	0.17	0.17	0.19	0.18	0.19	0.14	0.19	0.17	24
30	0.17	0.16	0.17	0.17	S	0.22	0.15	0.18	0.18	0.17	0.16	0.17	0.17	0.18	0.19	0.18	0.17	0.18	0.16	0.16	0.17	0.17	0.17	0.18	0.15	0.22	0.17	24	
HOURLY MAX	0.23	0.23	0.25	0.25	0.24	0.25	0.26	0.39	0.31	0.34	0.34	0.34	0.30	0.28	0.29	0.33	0.28	0.25	0.31	0.50	0.42	0.30	0.23	0.22					
HOURLY AVG	0.17	0.17	0.18	0.18	0.18	0.19	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.17	0.17	0.18	0.19	0.18	0.17	0.17	0.17					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

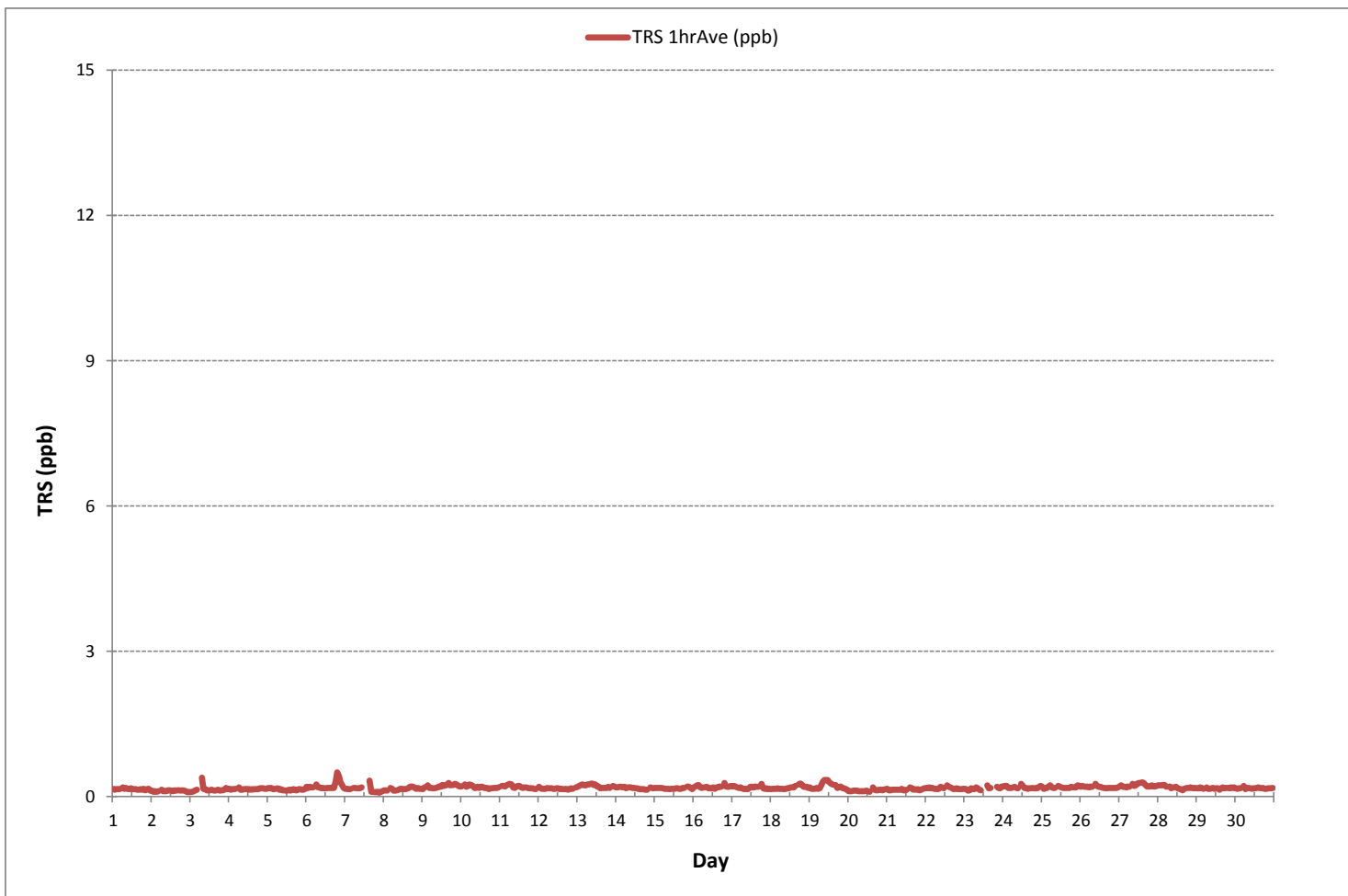
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	680			
MINIMUM 1-HR AVERAGE:	0.08	ppb @ HOUR	21	ON DAY 7
MAXIMUM 1-HR AVERAGE:	0.50	ppb @ HOUR	19	ON DAY 6
MAXIMUM 24-HR AVERAGE:	0.23	ppb		ON DAY 27
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	715 hrs
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	99.3 %
STANDARD DEVIATION:	0.04		MONTHLY AVERAGE:	0.18 ppb

TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)





PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59						
DAY 1	0.20	0.20	0.20	0.20	0.20	S	0.33	0.25	0.26	0.28	0.23	0.23	0.26	0.25	0.25	0.25	0.28	0.28	0.28	0.28	0.28	0.31	0.31	0.28	0.20	0.33	0.26	24		
2	0.26	0.26	0.28	0.26	0.31	S	0.31	0.30	0.31	0.28	0.31	0.33	0.30	0.30	0.33	0.31	0.31	0.33	0.31	0.28	0.30	0.28	0.26	0.26	0.26	0.33	0.29	24		
3	0.28	0.30	0.30	0.31	0.33	S	S1	S1	0.36	0.34	0.33	0.33	0.33	0.33	0.36	0.33	0.33	0.36	0.33	0.36	0.33	0.33	0.39	0.36	0.28	0.39	0.33	22		
4	0.39	0.33	0.36	0.33	0.36	S	0.47	0.39	0.36	0.36	0.39	0.36	0.36	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41	0.41	0.41	0.39	0.33	0.47	0.38	24		
5	0.41	0.47	0.41	0.41	0.39	S	0.44	0.39	0.41	0.36	0.38	0.36	0.33	0.33	0.36	0.36	0.36	0.33	0.38	0.41	0.33	0.33	0.33	0.38	0.33	0.47	0.38	24		
6	0.43	0.43	0.41	0.39	0.38	S	0.54	0.39	0.38	0.38	0.39	0.38	0.36	0.39	0.39	0.41	0.41	0.41	0.57	0.81	0.72	0.54	0.46	0.39	0.36	0.81	0.45	24		
7	0.39	0.36	0.39	0.36	S	0.44	0.39	0.36	0.41	0.36	C	C	C	C	C	C	0.30	0.28	0.26	0.23	0.23	0.25	0.20	0.25	0.20	0.44	0.32	24		
8	0.28	0.20	0.18	S	0.28	0.26	0.20	0.20	0.23	0.20	0.20	0.23	0.26	0.23	0.25	0.28	0.28	0.28	0.28	0.28	0.25	0.26	0.25	0.25	0.18	0.28	0.24	24		
9	0.23	0.25	S	0.36	0.23	0.28	0.25	0.23	0.28	0.26	0.28	0.28	0.93	0.41	0.72	0.39	0.80	0.31	0.31	0.30	0.33	0.33	0.31	0.28	0.23	0.93	0.36	24		
10	0.28	S	0.44	0.26	0.30	0.36	0.30	0.28	0.26	0.26	0.28	0.23	0.31	0.30	0.25	0.23	0.28	0.25	0.28	0.22	0.25	0.28	0.26	0.30	0.22	0.44	0.28	24		
11	S	0.33	0.28	0.28	0.30	0.33	0.36	0.38	0.30	0.26	0.30	0.33	0.30	0.33	0.26	0.28	0.28	0.28	0.25	0.26	0.30	0.26	0.25	S	0.25	0.38	0.30	24		
12	0.31	0.26	0.25	0.25	0.26	0.28	0.28	0.25	0.28	0.25	0.25	0.25	0.28	0.25	0.28	0.22	0.25	0.25	0.25	0.22	0.22	0.23	S	0.28	0.22	0.31	0.26	24		
13	0.28	0.33	0.33	0.33	0.30	0.30	0.33	0.30	0.36	0.36	0.30	0.28	0.28	0.26	0.25	0.25	0.23	0.28	0.25	0.25	0.26	S	0.30	0.28	0.23	0.36	0.29	24		
14	0.23	0.26	0.28	0.28	0.30	0.28	0.23	0.26	0.25	0.26	0.30	0.28	0.25	0.23	0.26	0.25	0.23	0.26	0.23	0.23	S	0.36	0.28	0.26	0.23	0.36	0.26	24		
15	0.28	0.30	0.28	0.30	0.30	0.26	0.23	0.25	0.23	0.23	0.23	0.26	0.26	0.28	0.28	0.25	0.22	0.25	0.25	0.22	0.25	S	0.36	0.28	0.28	0.23	0.22	0.36	0.26	24
16	0.26	0.30	0.33	0.33	0.30	0.28	0.28	0.28	0.30	0.28	0.26	0.26	0.26	0.25	0.28	0.30	0.30	0.28	S	0.44	0.28	0.28	0.28	0.30	0.25	0.44	0.29	24		
17	0.28	0.33	0.28	0.28	0.28	0.28	0.28	0.23	0.30	0.25	0.28	0.33	0.30	0.28	0.31	0.30	0.30	S	0.51	0.30	0.30	0.30	0.26	0.28	0.23	0.51	0.30	24		
18	0.25	0.33	0.28	0.26	0.28	0.28	0.28	0.26	0.28	0.25	0.28	0.28	0.30	0.33	0.33	0.38	S	0.41	0.36	0.33	0.28	0.30	0.28	0.28	0.25	0.41	0.30	24		
19	0.31	0.26	0.26	0.23	0.28	0.25	0.26	0.36	0.41	0.41	0.43	0.41	0.36	0.36	0.36	S	0.38	0.28	0.28	0.30	0.28	0.28	0.28	0.22	0.22	0.43	0.32	24		
20	0.23	0.25	0.20	0.30	0.25	0.26	0.22	0.28	0.25	0.26	0.28	0.25	0.28	0.28	S	0.41	0.31	0.28	0.28	0.30	0.28	0.28	0.30	0.30	0.20	0.41	0.28	24		
21	0.31	0.28	0.30	0.28	0.30	0.30	0.30	0.33	0.31	0.30	0.30	0.28	0.30	S	0.38	0.36	0.28	0.30	0.30	0.28	0.28	0.28	0.30	0.30	0.28	0.38	0.30	24		
22	0.36	0.30	0.33	0.30	0.30	0.30	0.30	0.28	0.30	0.33	0.33	0.30	S	0.36	0.33	0.33	0.33	0.30	0.28	0.30	0.28	0.30	0.28	0.28	0.28	0.36	0.31	24		
23	0.28	0.26	0.25	0.25	0.28	0.30	0.28	0.28	0.33	0.25	0.23	S	0.36	S1	S1	0.25	0.26	C1	C1	X	0.26	0.25	0.20	0.26	0.20	0.36	0.27	19		
24	0.25	0.25	0.28	0.23	0.22	0.22	0.22	0.23	0.22	0.20	S	0.33	0.25	0.20	0.20	0.17	0.20	0.18	0.20	0.20	0.20	0.22	0.23	0.28	0.17	0.33	0.23	24		
25	0.22	0.20	0.20	0.20	0.26	0.28	0.23	0.22	0.20	S	0.30	0.23	0.22	0.23	0.23	0.23	0.20	0.20	0.26	0.23	0.22	0.28	0.25	0.25	0.20	0.30	0.23	24		
26	0.23	0.26	0.23	0.25	0.25	0.22	0.28	0.25	S	0.33	0.25	0.25	0.28	0.23	0.22	0.25	0.23	0.23	0.25	0.20	0.22	0.23	0.23	0.23	0.20	0.33	0.24	24		
27	0.23	0.30	0.23	0.23	0.25	0.25	0.23	S	0.36	0.28	0.28	0.30	0.36	0.36	0.33	0.38	0.30	0.28	0.25	0.28	0.30	0.28	0.30	0.33	0.23	0.38	0.29	24		
28	0.30	0.30	0.28	0.33	0.33	0.28	S	0.38	0.23	0.31	0.28	0.30	0.23	0.26	0.25	0.23	0.28	0.25	0.26	0.26	0.28	0.28	0.25	0.28	0.23	0.38	0.28	24		
29	0.26	0.25	0.26	0.28	0.28	S	0.28	0.22	0.20	0.25	0.26	0.25	0.25	0.23	0.20	0.22	0.28	0.22	0.25	0.23	0.23	0.23	0.26	0.23	0.20	0.28	0.24	24		
30	0.22	0.20	0.22	0.20	S	0.28	0.18	0.25	0.23	0.20	0.25	0.26	0.22	0.23	0.23	0.26	0.22	0.25	0.20	0.20	0.25	0.20	0.25	0.18	0.28	0.28	0.23	24		
HOURLY MAX	0.43	0.47	0.44	0.41	0.39	0.44	0.54	0.39	0.41	0.41	0.43	0.41	0.93	0.41	0.72	0.41	0.80	0.41	0.57	0.81	0.72	0.54	0.46	0.39						
HOURLY AVG	0.28	0.29	0.29	0.29	0.29	0.29	0.30	0.29	0.30	0.29	0.29	0.29	0.31	0.29	0.31	0.30	0.30	0.29	0.30	0.30	0.29	0.29	0.28	0.28						

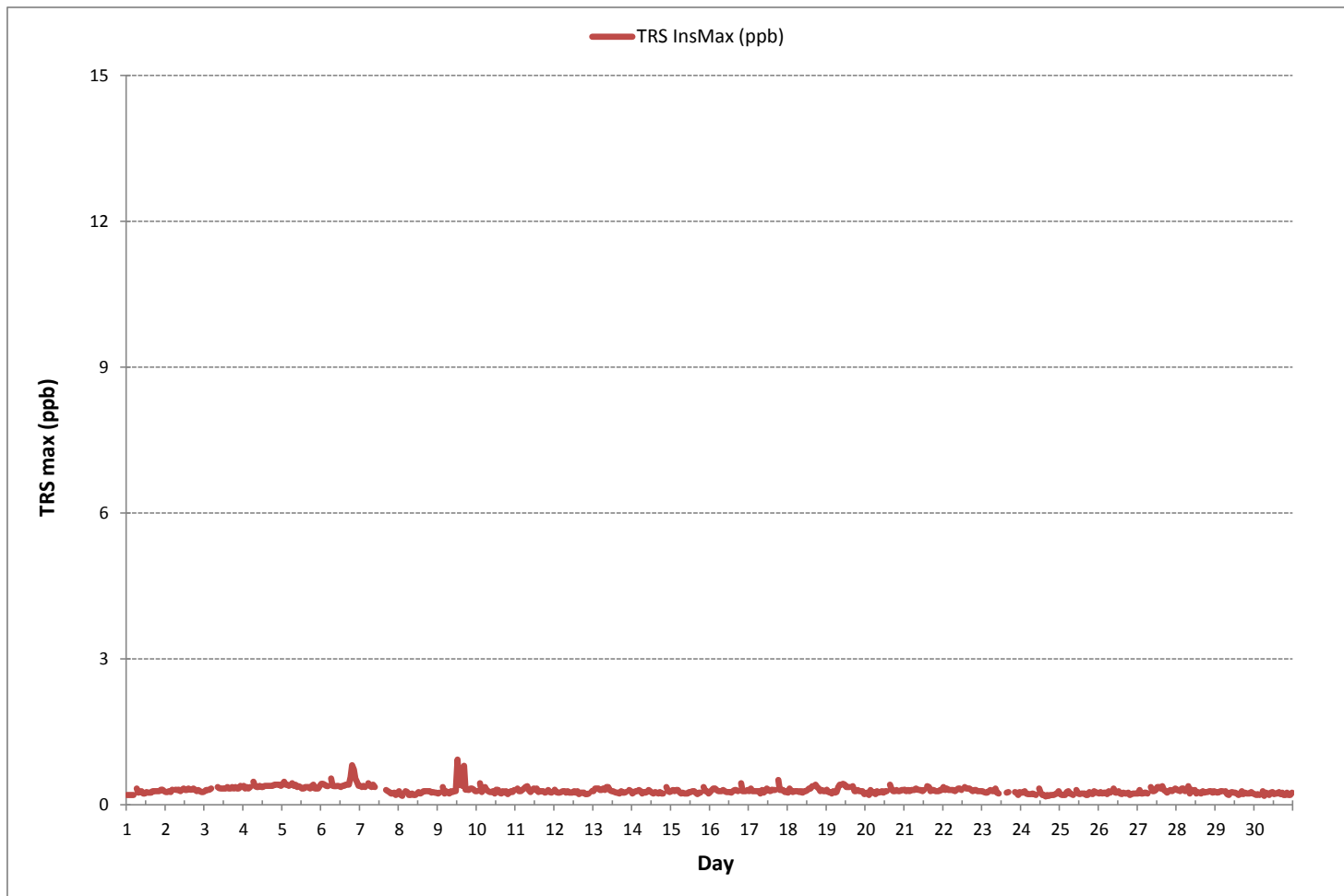
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

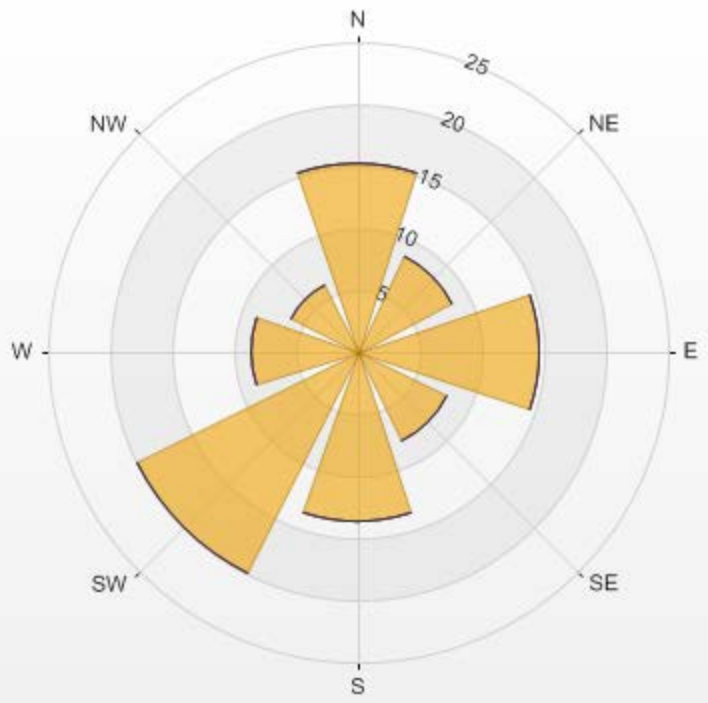
NUMBER OF NON-ZERO READINGS:	676
MAXIMUM INSTANTANEOUS VALUE:	0.93 ppb @ HOUR 12 ON DAY 9
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	0.07
OPERATIONAL TIME:	713 hrs

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)

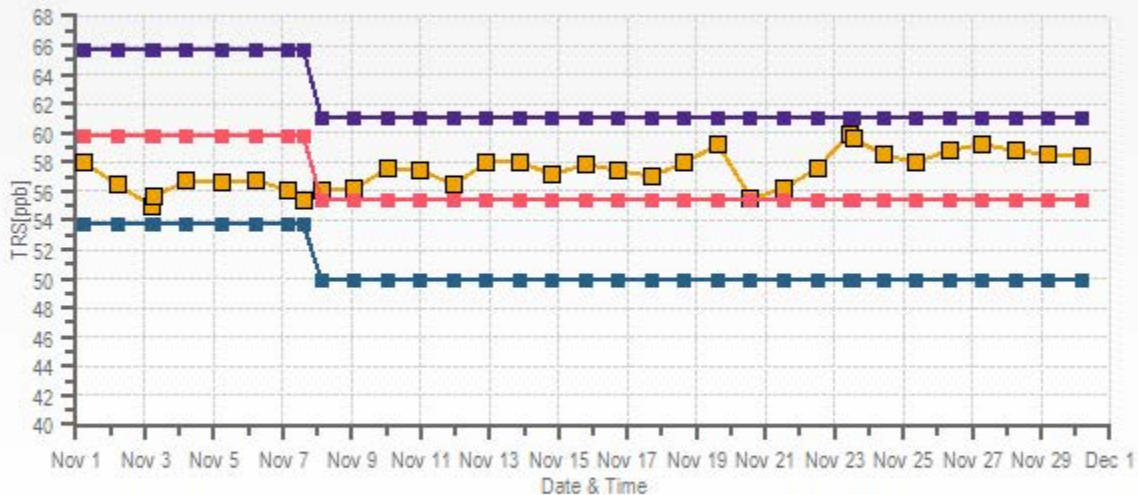


% Icon Classes (ppb) 95 0-1 0 1-3 0 3-10 0 >10.0

PRAMP_842 Poll.: PRAMP_842-TRS[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 5.03% Calm Poll Avg: 0.18[ppb]



TRS[ppb] Calibration: PRAMP_842 Monthly: 17/11 Type: Span



—■— Span Meas —■— Span Ref —■— Span Low —■— Span High

TOTAL HYDROCARBON



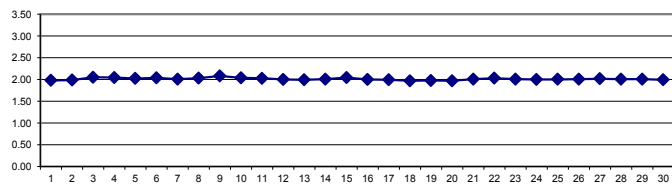
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.			
DAY 1	1.97	1.97	1.96	1.96	1.96	S	1.97	1.97	1.98	1.97	1.97	1.97	1.98	1.98	1.99	1.99	1.99	1.99	1.99	2.00	2.00	2.00	2.00	2.00	1.96	2.00	1.98	24		
2	1.99	1.99	1.99	1.99	1.99	S	1.99	1.98	1.98	1.98	1.99	1.99	1.99	1.99	2.00	1.99	1.98	1.98	1.97	1.99	1.99	2.00	2.00	2.01	1.97	2.01	1.99	24		
3	2.05	2.09	2.13	2.22	2.22	S	2.11	2.09	2.10	2.07	2.01	2.00	2.00	2.01	2.00	2.00	2.00	2.01	2.01	2.00	2.01	2.00	2.01	2.02	2.01	2.00	2.22	2.05	24	
4	2.02	2.01	2.01	2.02	2.02	S	2.02	2.02	2.02	2.03	2.04	2.03	2.04	2.04	2.05	2.07	2.06	2.06	2.07	2.07	2.08	2.08	2.08	2.12	2.01	2.12	2.05	24		
5	2.17	2.17	2.14	2.13	2.05	S	2.01	1.99	2.00	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.99	1.99	2.00	2.00	2.01	2.01	2.05	1.98	2.17	2.02	24		
6	2.04	2.04	2.04	2.03	2.03	S	2.03	2.04	2.04	2.03	2.04	2.03	2.03	2.04	2.04	2.03	2.04	2.03	2.04	2.03	2.04	2.08	2.07	2.05	2.04	2.02	2.02	2.08	2.04	24
7	2.04	2.02	2.01	2.00	S	2.00	2.00	1.99	1.99	1.99	2.00	C	C	C	C	2.00	1.99	1.99	2.00	2.00	2.00	2.00	2.01	2.11	1.99	2.11	2.01	24		
8	2.12	2.06	2.04	S	2.03	2.02	2.01	2.01	2.01	2.02	2.03	2.02	2.02	2.02	2.02	2.03	2.04	2.05	2.05	2.04	2.03	2.04	2.05	2.04	2.01	2.12	2.03	24		
9	2.06	2.11	S	2.06	2.04	2.03	2.03	2.03	2.03	2.06	2.06	2.05	2.05	2.06	2.07	2.08	2.08	2.15	2.16	2.18	2.13	2.11	2.10	2.10	2.03	2.18	2.08	24		
10	2.10	S	2.13	2.12	2.07	2.02	2.01	2.04	2.02	2.01	2.02	2.02	2.02	2.02	2.01	2.02	2.03	2.02	2.02	2.04	2.05	2.05	2.05	2.04	2.01	2.13	2.04	24		
11	S	2.06	2.03	2.04	2.03	2.04	2.05	2.05	2.05	2.07	2.08	2.06	2.02	2.00	2.01	2.01	2.01	2.00	2.00	2.00	2.00	2.00	1.99	1.99	S	1.99	2.08	2.03	24	
12	1.99	1.99	1.99	2.00	2.00	2.00	2.00	2.00	2.00	X	2.00	2.00	2.01	1.99	2.01	1.99	1.99	2.00	2.00	2.00	1.99	1.99	S	2.07	1.99	2.07	2.00	23		
13	2.00	2.00	1.99	1.99	1.99	2.01	1.99	1.99	1.99	1.99	1.99	2.00	1.99	1.99	1.99	1.98	2.02	2.00	1.99	1.99	1.99	S	1.99	1.99	1.98	2.02	1.99	24		
14	1.99	1.99	2.00	2.00	2.00	2.00	2.00	2.01	2.01	2.00	2.01	2.02	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	S	2.03	2.03	2.03	1.99	2.03	2.01	24		
15	2.04	2.04	2.04	2.04	2.04	2.03	2.03	2.03	2.06	2.04	2.02	2.03	2.03	2.04	2.05	2.04	2.06	2.05	X	S	2.09	2.09	2.06	2.07	2.02	2.09	2.05	23		
16	2.02	2.00	2.00	2.01	1.98	1.99	2.00	1.99	2.00	2.00	2.04	2.03	2.01	1.99	2.02	1.99	2.00	2.01	S	2.00	2.03	2.00	1.99	1.99	1.98	2.04	2.00	24		
17	2.00	2.00	2.00	2.00	2.02	2.00	2.01	2.01	2.01	2.00	2.00	2.00	1.98	C1	C1	C1	Y	C1	C1	C1	1.97	1.97	1.96	1.95	1.95	2.02	1.99	17		
18	1.96	1.97	1.96	1.97	1.98	1.97	1.98	1.97	1.94	1.97	1.99	1.96	1.98	1.99	1.99	1.97	S	1.98	2.00	1.99	1.96	1.95	1.95	1.95	1.94	2.00	1.97	24		
19	1.94	1.95	1.95	1.96	1.96	1.95	1.96	2.00	2.03	2.05	2.06	2.05	2.05	2.03	2.00	S	1.95	1.94	1.94	1.93	1.94	1.94	1.94	1.94	1.93	2.06	1.98	24		
20	1.94	1.94	1.94	1.95	1.95	1.95	1.95	1.95	1.95	1.96	1.97	1.99	1.98	1.99	S	1.99	2.00	1.99	1.98	1.99	1.99	1.99	2.00	1.99	1.94	2.00	1.97	24		
21	1.98	1.99	1.99	1.99	2.00	2.01	2.00	2.02	2.03	2.05	2.01	1.99	1.98	S	2.00	2.00	2.01	2.00	1.99	2.00	2.03	2.03	2.08	2.06	1.98	2.08	2.01	24		
22	2.06	2.07	2.05	2.05	2.06	2.06	2.03	2.02	2.02	2.01	2.03	2.07	S	2.08	2.08	2.09	2.07	2.02	2.00	2.00	1.98	1.97	1.98	1.99	1.97	2.09	2.03	24		
23	2.00	2.01	2.03	2.00	2.01	2.03	2.03	1.98	1.93	C1	C1	C1	Y	Y	Y	C1	C1	C1	C1	1.99	2.00	2.01	2.03	1.93	2.03	2.01	14			
24	2.02	2.03	1.99	2.00	2.00	1.99	1.99	2.00	2.00	2.04	S	2.01	2.02	2.01	2.02	1.99	2.00	2.04	2.01	1.99	1.98	1.98	1.99	2.00	1.98	2.04	2.00	24		
25	2.00	1.97	1.98	1.98	1.99	2.02	2.02	2.01	2.01	S	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	1.97	2.02	2.01	24		
26	2.01	2.01	2.01	2.01	2.01	2.02	2.02	2.01	S	2.02	2.02	2.01	2.01	2.00	2.00	2.01	2.00	2.00	2.01	2.00	2.01	2.02	2.02	2.01	2.00	2.02	2.01	24		
27	2.01	2.00	1.99	2.00	2.00	2.00	2.00	S	2.00	2.00	2.01	2.02	2.03	2.06	2.05	2.05	2.04	2.03	2.02	2.02	2.02	2.03	2.04	2.04	1.99	2.06	2.02	24		
28	2.05	2.04	2.03	2.02	2.01	2.00	S	2.00	1.99	2.00	2.00	2.00	1.99	1.99	1.99	2.00	2.00	2.01	2.01	1.98	2.02	2.02	2.02	2.02	1.98	2.05	2.01	24		
29	2.02	2.03	2.03	2.03	2.05	S	2.02	2.01	2.01	2.02	2.03	2.02	2.01	2.03	2.00	2.00	1.99	2.00	1.99	1.99	1.99	1.99	1.99	1.99	1.99	2.05	2.01	24		
30	2.00	1.99	1.99	1.99	S	1.99	1.99	1.99	1.99	1.99	1.99	2.00	1.99	1.99	2.00	2.00	2.00	2.00	2.00	1.99	1.99	1.99	1.99	1.98	1.98	2.00	1.99	24		
HOURLY MAX	2.17	2.17	2.14	2.22	2.22	2.06	2.11	2.09	2.10	2.07	2.07	2.08	2.06	2.08	2.08	2.09	2.08	2.15	2.16	2.18	2.13	2.11	2.10	2.12						
HOURLY AVG	2.02	2.02	2.02	2.02	2.02	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.02					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

24 HR AVERAGES November 2017

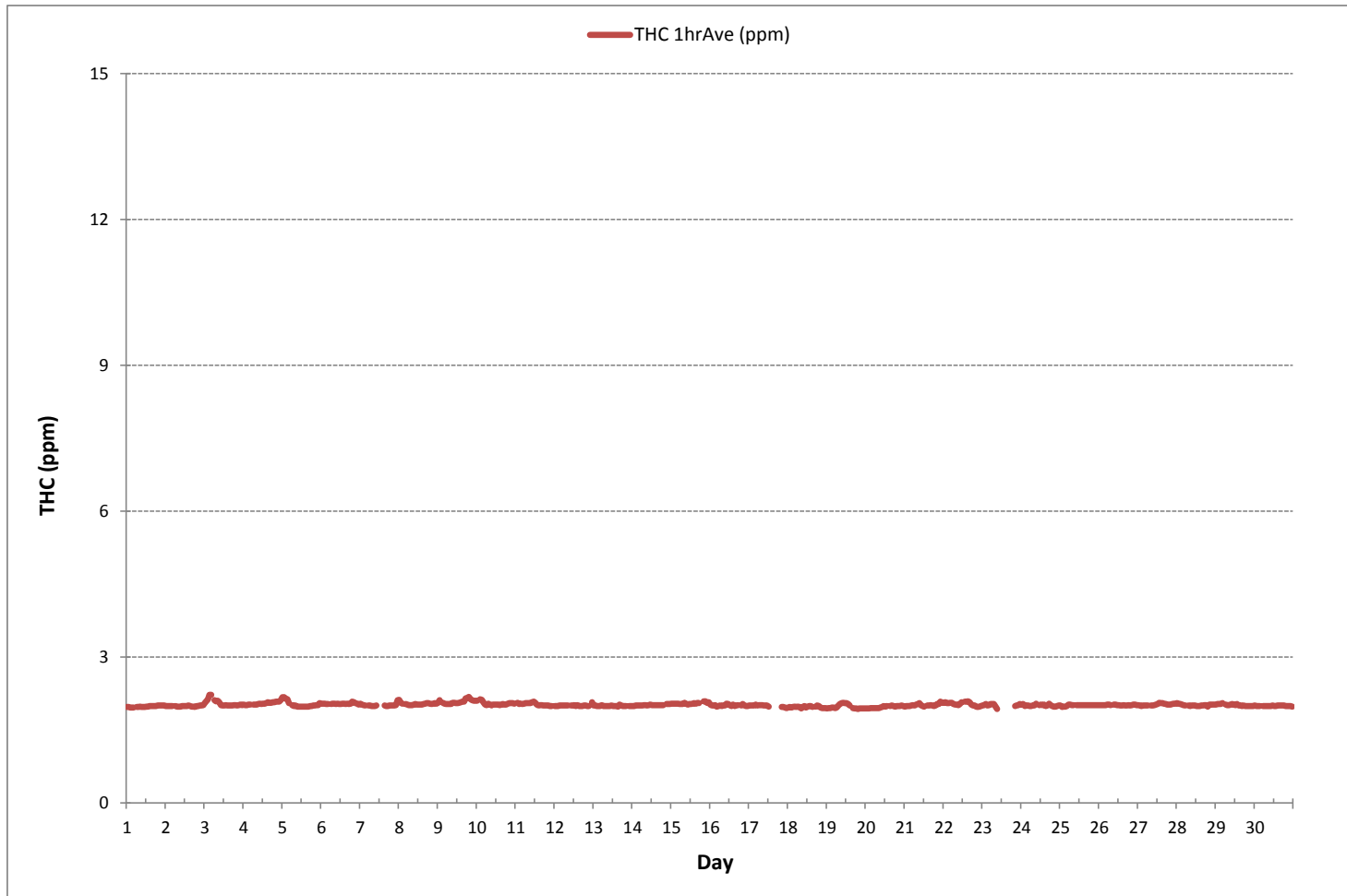


MONTHLY SUMMARY

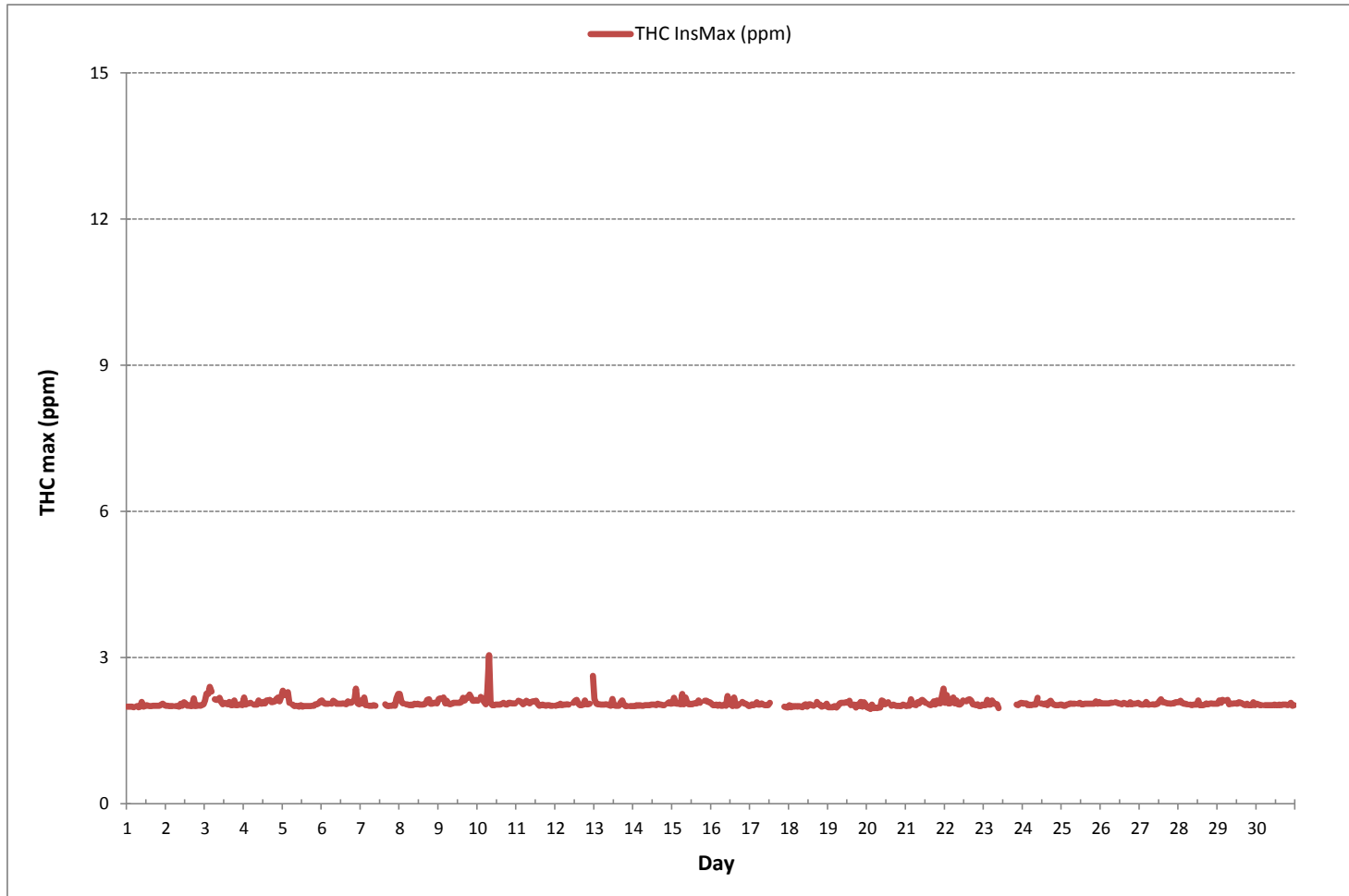
NUMBER OF NON-ZERO READINGS:	668			
MINIMUM 1-HR AVERAGE:	1.93 ppm	@ HOUR	19	ON DAY
MAXIMUM 1-HR AVERAGE:	2.22 ppm	@ HOUR	3	ON DAY
MAXIMUM 24-HR AVERAGE:	2.08 ppm			ON DAY
IZS CALIBRATION TIME:	29 hrs	OPERATIONAL TIME:	701	hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	97.4	%
STANDARD DEVIATION:	0.04	MONTHLY AVERAGE:	2.01	ppm



TOTAL HYDROCARBONS Hourly Averages (THC ppm)



TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



Wind: PRAMP_842
 Poll.: PRAMP_842-THC55[ppm]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 5.09%

Calm Avg: 2.03 [ppm]

Direction	0-2	2-3	3-5	5-10	>10.0	Total
N	9.9	5.8	0.0	0.0	0.0	15.7
NE	3.6	5.1	0.0	0.0	0.0	8.7
E	2.8	11.8	0.0	0.0	0.0	14.7
SE	2.4	5.8	0.0	0.0	0.0	8.2
S	4.6	8.8	0.0	0.0	0.0	13.5
SW	6.9	12.4	0.0	0.0	0.0	19.3
W	4.9	3.7	0.0	0.0	0.0	8.7
NW	4.3	1.8	0.0	0.0	0.0	6.1
Summary	39.5	55.4	0.0	0.0	0.0	94.9

% Icon Classes (ppm)

40 0-2

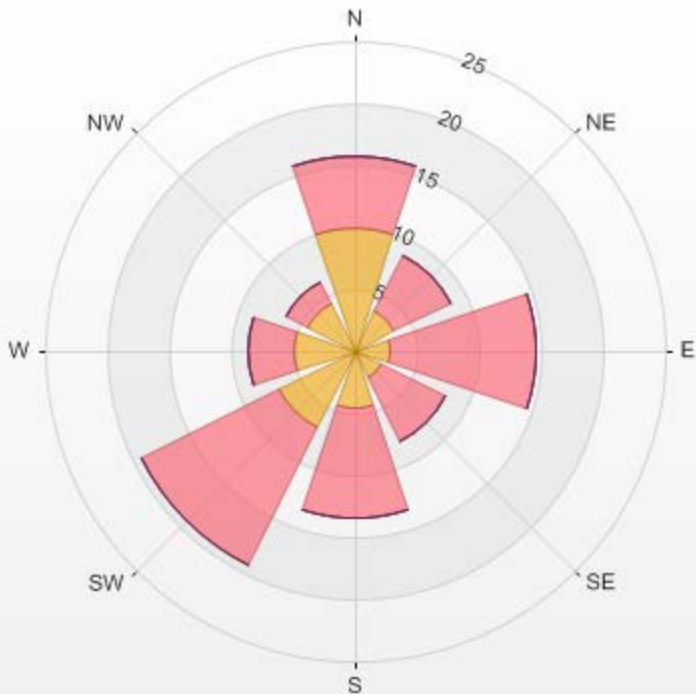
55 2-3

0 3-5

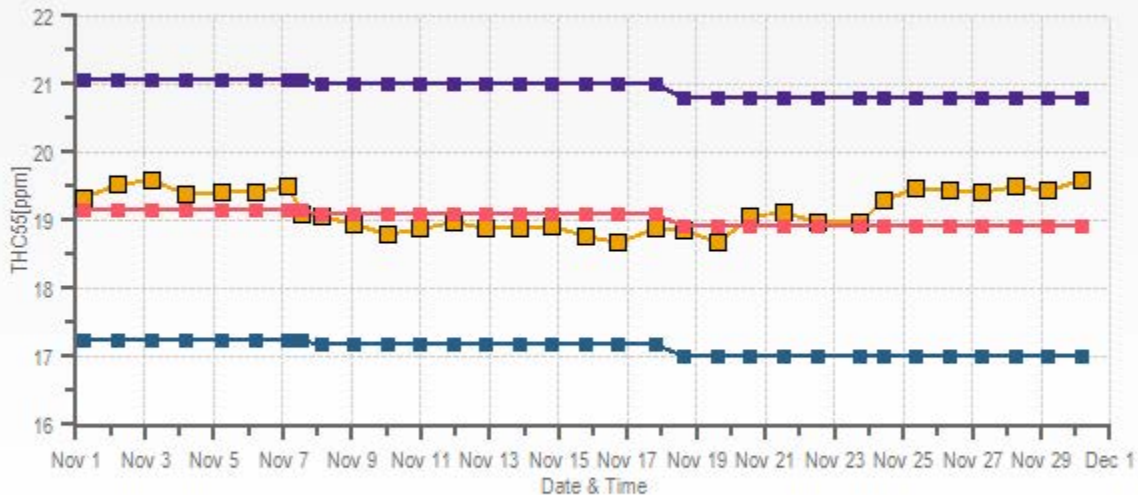
0 5-10

0 >10.0

PRAMP_842 Poll.: PRAMP_842-THC55[ppm] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 5.09% Calm Poll Avg: 2.03[ppm]



THC55[ppm] Calibration: PRAMP_842 Monthly: 17/11 Type: Span



■ Span Meas
 ■ Span Ref
 ■ Span Low
 ■ Span High

METHANE



PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

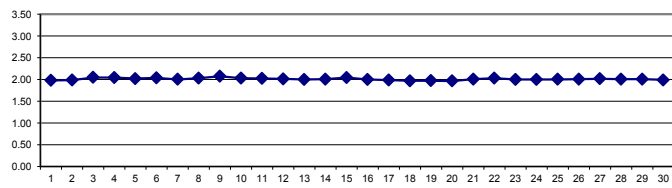
METHANE Hourly Averages (CH₄ ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	1.97	1.97	1.96	1.96	1.96	S	1.97	1.97	1.98	1.97	1.97	1.97	1.98	1.98	1.99	1.99	1.99	1.99	1.99	2.00	1.99	2.00	2.00	2.00	1.96	2.00	1.98	24	
2	1.99	1.99	1.99	1.98	1.99	S	1.99	1.98	1.98	1.98	1.99	1.99	1.99	1.99	2.00	1.99	1.98	1.98	1.97	1.99	1.99	2.00	2.00	2.01	1.97	2.01	1.99	24	
3	2.05	2.09	2.13	2.21	2.22	S	2.11	2.09	2.10	2.06	2.01	2.00	2.00	2.01	2.00	2.00	2.00	2.00	2.00	2.01	2.00	2.01	2.01	2.01	2.00	2.22	2.05	24	
4	2.01	2.01	2.01	2.01	2.02	S	2.02	2.02	2.02	2.03	2.03	2.03	2.04	2.04	2.05	2.06	2.05	2.06	2.07	2.07	2.07	2.07	2.08	2.08	2.12	2.01	2.12	2.04	24
5	2.17	2.17	2.13	2.12	2.04	S	2.01	1.99	2.00	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.99	2.00	2.00	2.01	2.01	2.05	1.98	2.17	2.02	24	
6	2.04	2.04	2.04	2.03	2.03	S	2.03	2.04	2.04	2.03	2.03	2.03	2.03	2.03	2.04	2.02	2.04	2.03	2.03	2.08	2.06	2.05	2.04	2.02	2.02	2.08	2.04	24	
7	2.04	2.02	2.01	2.00	S	2.00	1.99	1.99	1.99	1.99	1.99	C	C	C	C	2.00	1.99	1.98	1.99	2.00	2.00	2.00	2.00	2.11	1.98	2.11	2.00	24	
8	2.12	2.06	2.04	S	2.03	2.01	2.01	2.01	2.01	2.01	2.03	2.02	2.01	2.02	2.02	2.03	2.04	2.04	2.05	2.03	2.03	2.03	2.05	2.04	2.01	2.12	2.03	24	
9	2.06	2.11	S	2.06	2.04	2.03	2.03	2.03	2.03	2.05	2.06	2.05	2.05	2.05	2.07	2.08	2.07	2.14	2.16	2.17	2.13	2.10	2.10	2.10	2.03	2.17	2.08	24	
10	2.10	S	2.12	2.11	2.06	2.01	1.99	2.02	2.02	2.01	2.01	2.01	2.02	2.01	2.01	2.02	2.03	2.02	2.01	2.03	2.05	2.04	2.05	2.04	1.99	2.12	2.03	24	
11	S	2.06	2.03	2.04	2.03	2.04	2.05	2.05	2.05	2.05	2.07	2.08	2.05	2.02	2.00	2.00	2.00	2.00	1.99	2.00	2.00	1.99	1.99	S	1.99	2.08	2.03	24	
12	1.99	1.99	1.99	2.00	2.01	2.01	2.01	2.01	2.01	X	1.99	2.02	2.03	2.01	2.01	2.01	2.01	2.01	2.02	2.02	2.03	2.02	S	2.10	1.99	2.10	2.01	23	
13	2.03	2.02	2.02	2.01	2.01	2.00	2.01	2.01	2.01	2.01	2.00	2.01	2.00	2.00	2.00	1.99	2.02	2.00	1.99	1.99	1.98	S	1.99	1.99	1.98	2.03	2.00	24	
14	1.99	1.99	2.00	2.00	2.00	2.00	2.00	2.01	2.01	2.00	2.00	2.02	2.01	2.01	2.00	2.01	2.01	2.01	2.01	2.00	S	2.03	2.03	2.03	1.99	2.03	2.01	24	
15	2.04	2.04	2.04	2.04	2.04	2.03	2.03	2.03	2.06	2.04	2.02	2.03	2.03	2.04	2.04	2.04	2.06	2.05	X	S	2.09	2.09	2.06	2.07	2.02	2.09	2.05	23	
16	2.02	2.00	2.00	2.01	1.98	1.98	1.99	1.99	1.99	2.00	2.04	2.02	2.00	1.98	2.01	1.99	1.99	2.01	S	2.00	2.03	2.00	1.99	1.99	1.98	2.04	2.00	24	
17	1.99	2.00	1.99	2.00	2.02	2.00	2.00	2.01	2.01	2.00	2.00	1.99	1.98	C1	C1	C1	Y	C1	C1	C1	1.97	1.97	1.96	1.95	1.95	2.02	1.99	17	
18	1.96	1.97	1.97	1.97	1.98	1.97	1.98	1.97	1.94	1.97	1.99	1.96	1.98	2.00	2.00	1.97	S	1.98	2.01	1.99	1.96	1.95	1.95	1.95	1.94	2.01	1.97	24	
19	1.95	1.96	1.95	1.96	1.96	1.95	1.96	1.99	2.03	2.05	2.05	2.05	2.05	2.02	1.99	S	1.94	1.93	1.93	1.93	1.93	1.94	1.94	1.94	1.93	2.05	1.97	24	
20	1.94	1.94	1.94	1.94	1.94	1.95	1.95	1.95	1.95	1.95	1.97	1.98	1.98	1.99	S	1.99	2.00	1.99	1.98	1.99	1.99	1.98	2.00	1.98	1.94	2.00	1.97	24	
21	1.98	1.99	1.98	1.98	2.00	2.01	2.00	2.02	2.03	2.05	2.00	1.99	1.98	S	2.00	2.00	2.01	1.99	1.99	2.00	2.02	2.03	2.08	2.06	1.98	2.08	2.01	24	
22	2.05	2.06	2.04	2.05	2.05	2.06	2.03	2.02	2.02	2.01	2.03	2.06	S	2.08	2.08	2.09	2.07	2.02	2.00	2.00	1.98	1.97	1.98	1.99	1.97	2.09	2.03	24	
23	2.00	2.01	2.02	2.00	2.01	2.03	2.03	1.98	1.93	C1	C1	C1	Y	Y	Y	C1	C1	C1	C1	1.99	1.99	2.01	2.03	1.93	2.03	2.00	14		
24	2.02	2.02	1.99	1.99	2.00	1.99	1.99	2.00	2.00	2.04	S	2.01	2.01	2.01	2.01	2.02	1.99	2.00	2.04	2.01	1.99	1.98	1.98	1.99	2.00	1.98	2.00	24	
25	2.00	1.97	1.98	1.98	1.99	2.02	2.02	2.01	2.01	S	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	1.97	2.02	24	
26	2.01	2.01	2.01	2.01	2.01	2.02	2.02	2.01	S	2.02	2.02	2.01	2.01	2.00	2.00	2.01	2.00	2.00	2.01	2.00	2.01	2.02	2.02	2.01	2.00	2.02	2.01	24	
27	2.01	2.00	1.99	2.00	2.00	2.00	2.00	S	2.00	2.00	2.01	2.02	2.03	2.06	2.05	2.05	2.04	2.03	2.02	2.02	2.02	2.03	2.04	2.04	1.99	2.06	2.02	24	
28	2.05	2.04	2.03	2.02	2.01	2.00	S	2.00	1.99	2.00	2.00	2.00	1.99	1.99	1.99	2.00	2.00	2.01	2.01	1.98	2.02	2.02	2.02	2.02	1.98	2.05	2.01	24	
29	2.02	2.03	2.03	2.03	2.05	S	2.02	2.01	2.01	2.02	2.02	2.02	2.01	2.03	2.00	2.00	1.99	2.00	1.99	1.99	1.99	1.99	1.99	1.99	1.99	2.05	2.01	24	
30	2.00	1.99	1.99	1.99	S	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	2.00	2.00	2.00	2.00	1.99	1.99	1.99	1.99	1.98	1.98	2.00	1.99	24	
HOURLY MAX	2.17	2.17	2.13	2.21	2.22	2.06	2.11	2.09	2.10	2.06	2.07	2.08	2.05	2.08	2.08	2.09	2.07	2.14	2.16	2.17	2.13	2.10	2.10	2.12					
HOURLY AVG	2.02	2.02	2.01	2.02	2.02	2.00	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.02				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

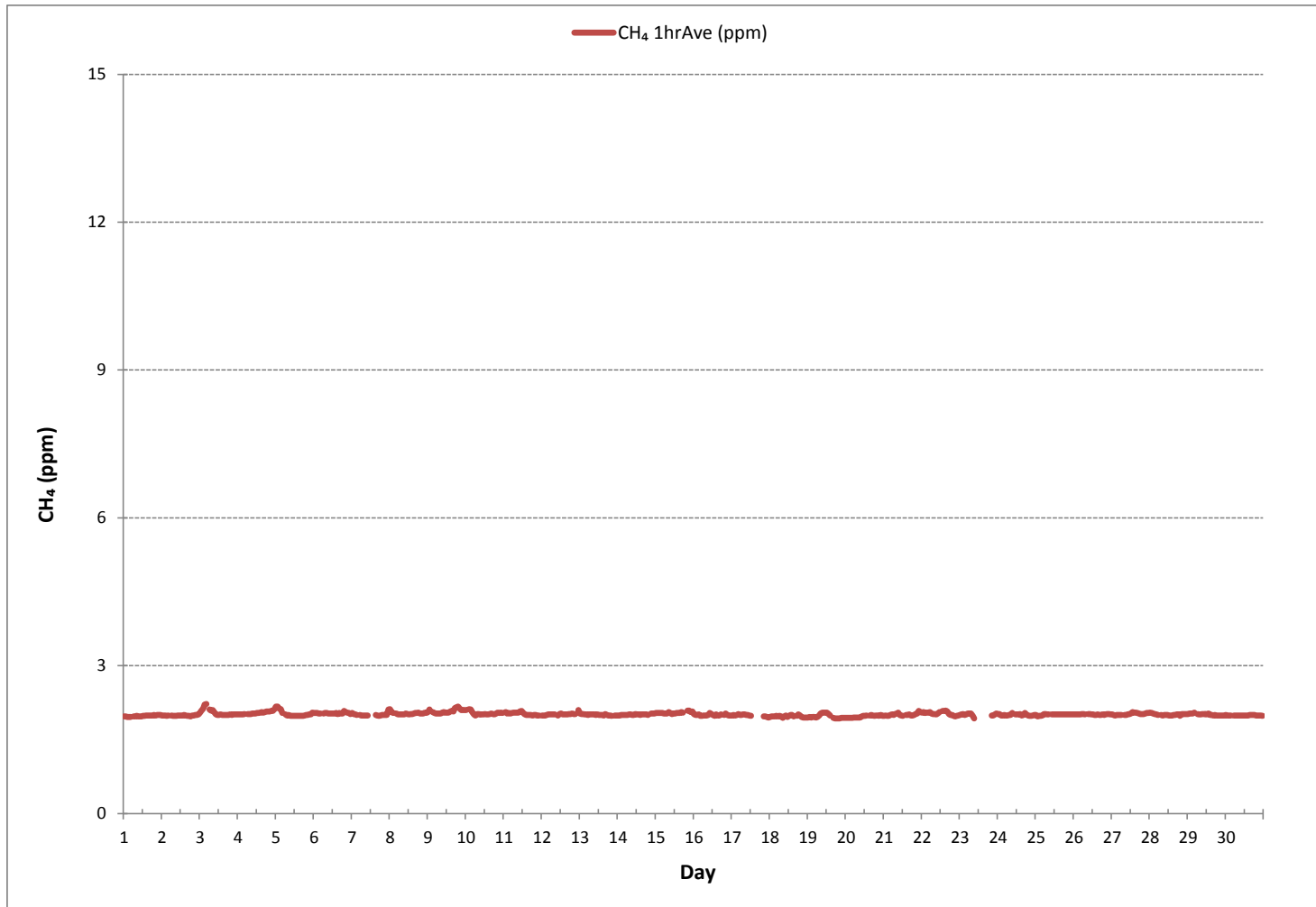
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	668			
MINIMUM 1-HR AVERAGE:	1.93 ppm	@ HOUR	17	ON DAY 19
MAXIMUM 1-HR AVERAGE:	2.22 ppm	@ HOUR	4	ON DAY 3
MAXIMUM 24-HR AVERAGE:	2.08 ppm			ON DAY 9
IZS CALIBRATION TIME:	29 hrs	OPERATIONAL TIME:	701	hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	97.4	%
STANDARD DEVIATION:	0.04	MONTHLY AVERAGE:	2.01	ppm

METHANE Hourly Averages (CH₄ ppm)





PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

METHANE MAX Instantaneous Maximum (CH₄ ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY 1	1.98	1.98	1.98	1.98	1.97	S	1.98	1.98	1.98	2.09	1.98	1.99	2.02	2.00	2.00	2.00	2.00	2.01	2.01	2.00	2.01	2.04	2.00	1.97	2.09	2.00	24		
2	2.00	2.01	2.00	1.99	1.99	S	1.99	1.99	1.99	1.99	2.00	2.07	2.00	2.00	2.01	2.00	1.99	2.15	1.99	2.00	2.01	2.01	2.01	2.04	1.99	2.15	2.01	24	
3	2.12	2.25	2.25	2.33	2.30	S	2.14	2.13	2.13	2.09	2.07	2.04	2.03	2.04	2.04	2.08	2.01	2.01	2.01	2.01	2.01	2.03	2.02	2.02	2.01	2.33	2.09	24	
4	2.02	2.03	2.04	2.05	2.02	S	2.02	2.03	2.03	2.10	2.06	2.04	2.08	2.05	2.09	2.10	2.13	2.06	2.07	2.08	2.08	2.08	2.09	2.16	2.02	2.16	2.07	24	
5	2.23	2.22	2.21	2.19	2.07	S	2.03	2.00	2.00	2.00	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	2.00	2.00	2.04	2.03	2.06	2.09	1.99	2.23	2.05	24	
6	2.06	2.06	2.05	2.04	2.04	S	2.04	2.11	2.09	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.09	2.06	2.06	2.09	2.08	2.36	2.05	2.03	2.03	2.36	2.07	24	
7	2.11	2.04	2.02	2.01	S	2.01	2.00	2.01	2.00	2.00	C	C	C	C	C	2.01	2.00	2.00	2.00	2.00	2.00	2.01	2.15	2.25	2.00	2.25	2.04	24	
8	2.25	2.08	2.05	S	2.04	2.02	2.02	2.02	2.02	2.04	2.03	2.03	2.02	2.02	2.03	2.04	2.05	2.05	2.14	2.05	2.04	2.06	2.06	2.05	2.02	2.25	2.05	24	
9	2.15	2.15	S	2.09	2.05	2.05	2.04	2.04	2.04	2.06	2.06	2.06	2.07	2.07	2.08	2.16	2.12	2.16	2.17	2.23	2.16	2.11	2.10	2.13	2.04	2.23	2.10	24	
10	2.11	S	2.13	2.15	2.09	2.03	2.02	2.04	2.04	2.02	2.02	2.02	2.03	2.02	2.03	2.05	2.06	2.03	2.02	2.06	2.06	2.06	2.06	2.05	2.02	2.15	2.05	24	
11	S	2.11	2.07	2.08	2.04	2.05	2.06	2.08	2.06	2.07	2.09	2.09	2.07	2.04	2.01	2.01	2.02	2.02	2.00	2.01	2.01	2.00	2.00	S	2.00	2.11	2.05	24	
12	2.00	2.00	2.01	2.05	2.02	2.02	2.02	2.03	2.02	X	X	2.06	2.07	2.02	2.04	2.02	2.02	2.03	2.05	2.04	2.03	2.04	S	2.62	2.00	2.62	2.06	22	
13	2.15	2.05	2.03	2.04	2.02	2.02	2.02	2.03	2.02	2.02	2.01	2.15	2.01	2.01	2.00	2.00	2.07	2.11	2.00	1.99	1.99	S	1.99	2.00	1.99	2.15	2.03	24	
14	2.00	2.00	2.00	2.00	2.01	2.00	2.00	2.02	2.01	2.02	2.02	2.03	2.02	2.02	2.01	2.04	2.02	2.02	2.02	2.02	2.01	S	2.05	2.07	2.05	2.00	2.07	2.02	24
15	2.05	2.16	2.05	2.05	2.05	2.03	2.04	2.04	2.18	2.06	2.03	2.04	2.04	2.05	2.05	2.05	2.12	2.06	X	S	2.10	2.10	2.08	2.08	2.03	2.18	2.07	23	
16	2.05	2.01	2.01	2.02	2.00	2.02	2.01	2.00	2.03	2.01	2.08	2.08	2.03	1.99	2.17	2.01	2.01	2.03	S	2.08	2.05	2.05	2.01	2.00	1.99	2.17	2.03	24	
17	2.00	2.00	2.02	2.04	2.07	2.01	2.02	2.02	2.03	2.01	2.01	2.00	2.00	C1	C1	C1	Y	C1	C1	C1	C1	1.98	1.98	1.97	1.97	2.07	2.01	16	
18	1.98	1.98	1.99	1.98	2.00	1.98	1.99	1.99	1.97	2.01	2.03	1.97	2.04	2.03	2.02	2.00	S	2.08	2.02	2.02	1.98	1.97	1.97	1.96	1.96	2.08	2.00	24	
19	1.97	1.97	1.97	1.97	2.00	1.98	1.99	2.02	2.06	2.06	2.06	2.06	2.06	2.05	2.01	S	2.02	1.95	1.94	1.94	1.94	1.96	1.94	1.95	1.94	2.06	1.99	24	
20	1.96	1.95	1.94	1.97	1.95	1.97	1.96	1.97	1.96	2.10	2.10	2.00	2.03	2.01	S	2.01	2.02	2.01	2.00	2.00	1.99	1.99	2.02	2.02	1.94	2.10	2.00	24	
21	1.99	2.01	2.01	1.99	2.02	2.02	2.01	2.06	2.05	2.08	2.06	2.09	2.06	S	2.03	2.01	2.03	2.02	2.02	2.02	2.06	2.04	2.15	2.09	1.99	2.15	2.04	24	
22	2.06	2.13	2.05	2.06	2.08	2.08	2.05	2.03	2.03	2.02	2.05	2.08	S	2.08	2.13	2.14	2.12	2.03	2.02	2.01	2.00	1.98	1.99	2.00	1.98	2.14	2.05	24	
23	2.02	2.02	2.10	2.00	2.03	2.04	2.04	2.05	2.02	1.96	C1	C1	C1	Y	Y	C1	C1	C1	C1	C1	2.01	2.01	2.04	2.06	1.96	2.10	2.03	14	
24	2.04	2.04	2.04	2.01	2.01	2.01	2.01	2.01	2.02	2.15	S	2.04	2.04	2.03	2.05	2.01	2.04	2.06	2.05	2.02	2.01	2.00	2.00	2.02	2.00	2.15	2.03	24	
25	2.02	2.00	1.99	2.00	2.03	2.04	2.04	2.04	2.03	S	2.03	2.06	2.03	2.03	2.04	2.03	2.04	2.03	2.04	2.04	2.04	2.04	2.04	2.03	2.04	1.99	2.06	2.03	24
26	2.04	2.05	2.05	2.04	2.05	2.05	2.05	2.06	S	2.06	2.05	2.05	2.04	2.03	2.05	2.04	2.03	2.03	2.07	2.03	2.04	2.04	2.04	2.05	2.03	2.07	2.05	24	
27	2.03	2.02	2.01	2.02	2.08	2.02	2.02	S	2.03	2.02	2.03	2.04	2.09	2.12	2.07	2.07	2.06	2.05	2.04	2.03	2.04	2.05	2.06	2.06	2.01	2.12	2.05	24	
28	2.07	2.10	2.05	2.03	2.03	S	2.02	2.01	2.02	2.02	2.02	2.02	2.01	2.01	2.01	2.01	2.02	2.05	2.03	2.03	2.05	2.04	2.04	2.04	2.01	2.10	2.03	24	
29	2.03	2.05	2.05	2.12	2.08	S	2.03	2.03	2.03	2.04	2.04	2.03	2.03	2.07	2.06	2.05	2.01	2.01	2.01	2.01	2.00	2.01	2.00	2.01	2.00	2.12	2.03	24	
30	2.03	2.03	2.00	2.01	S	2.01	2.01	2.01	2.01	2.01	2.00	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.02	2.06	2.00	2.00	2.06	2.01	24	
HOURLY MAX	2.25	2.25	2.25	2.33	2.30	2.08	2.14	2.13	2.18	2.15	2.10	2.15	2.09	2.12	2.17	2.16	2.13	2.16	2.17	2.23	2.16	2.36	2.15	2.62					
HOURLY AVG	2.05	2.05	2.04	2.05	2.04	2.02	2.02	2.03	2.03	2.04	2.04	2.04	2.04	2.03	2.04	2.04	2.04	2.04	2.03	2.03	2.03	2.04	2.04	2.06					

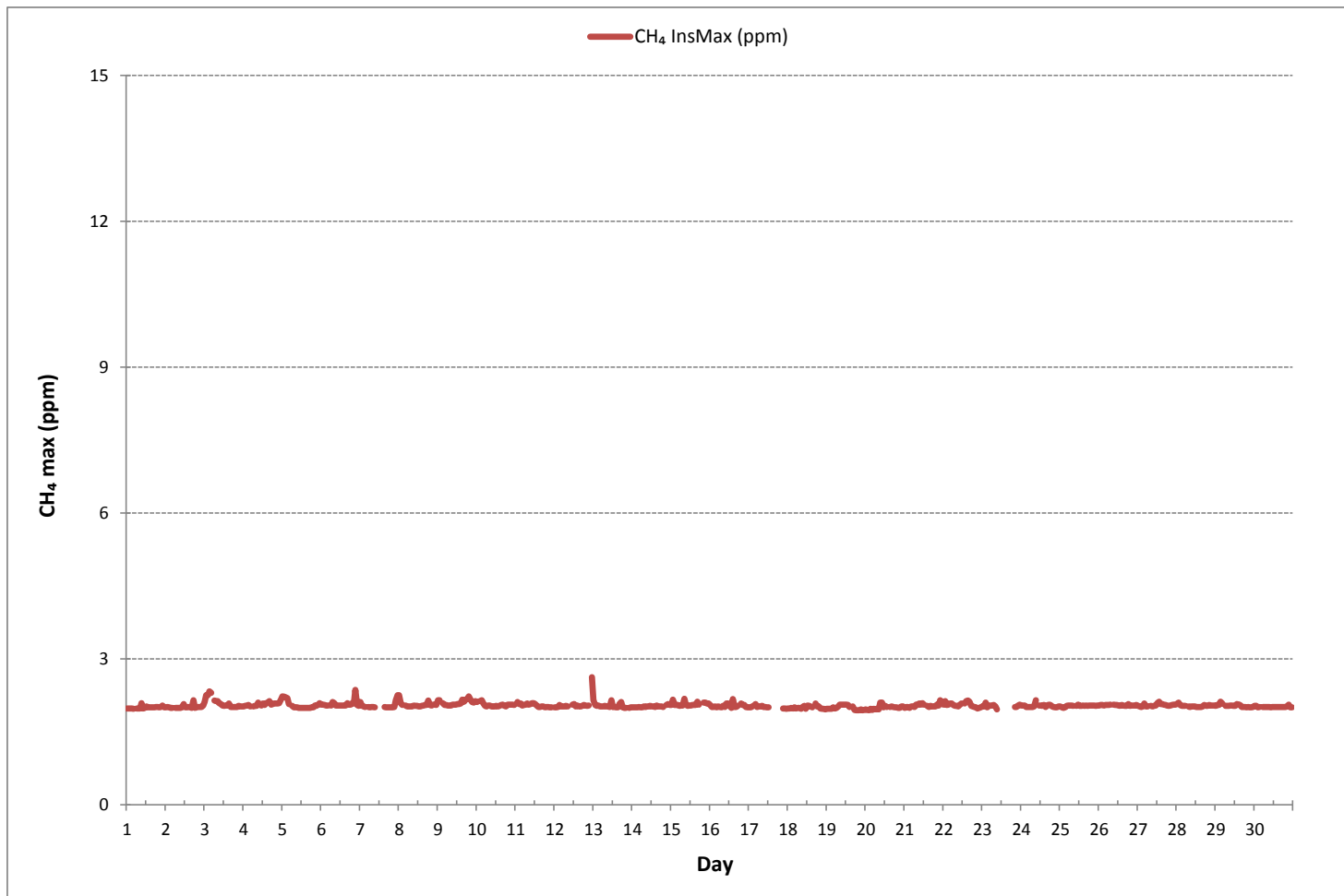
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	665
MAXIMUM INSTANTANEOUS VALUE:	2.62 ppm @ HOUR 23 ON DAY 12
IZS CALIBRATION TIME:	29 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	699 hrs
STANDARD DEVIATION:	0.05

METHANE MAX Instantaneous Maximum (CH₄ ppm)



Wind: PRAMP_842
 Poll.: PRAMP_842-CH₄[ppm]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

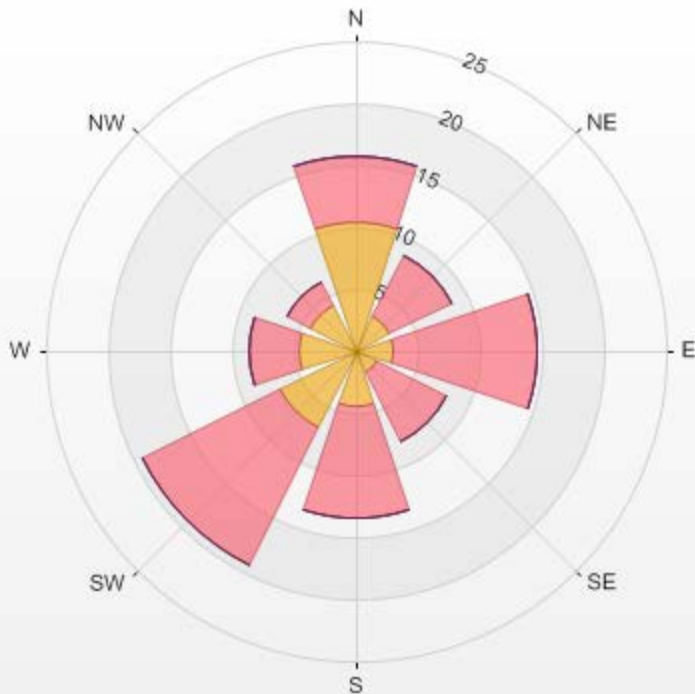
Calm: 5.09%

Calm Avg: 2.03 [ppm]

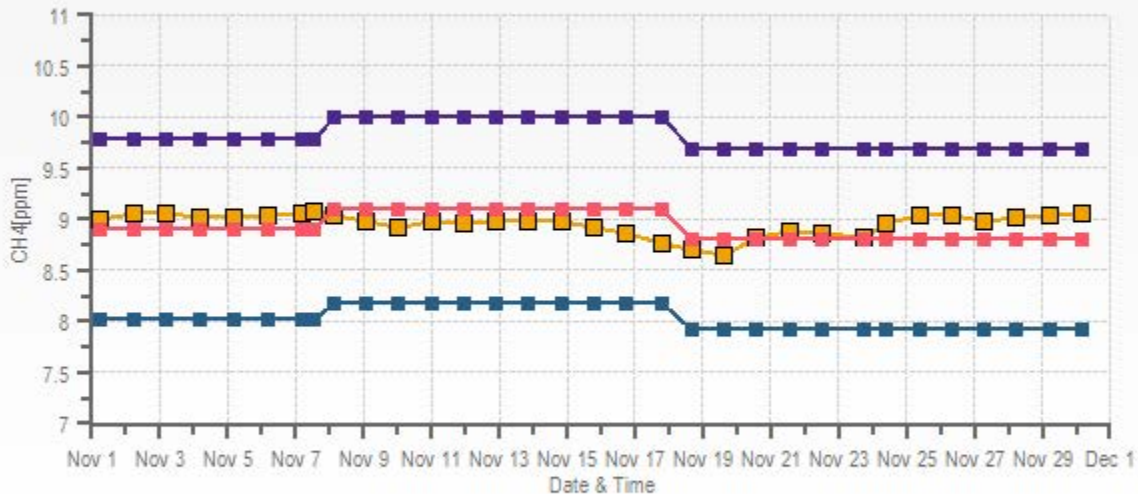
Direction	0-2	2-3	3-5	5-10	>10.0	Total
N	10.5	5.2	0.0	0.0	0.0	15.7
NE	3.1	5.5	0.0	0.0	0.0	8.7
E	3.0	11.7	0.0	0.0	0.0	14.7
SE	2.0	6.3	0.0	0.0	0.0	8.2
S	4.5	9.0	0.0	0.0	0.0	13.5
SW	6.9	12.4	0.0	0.0	0.0	19.3
W	4.6	4.0	0.0	0.0	0.0	8.7
NW	4.2	2.0	0.0	0.0	0.0	6.1
Summary	38.8	56.2	0.0	0.0	0.0	94.9

% Icon Classes (ppm) 39 0-2 56 2-3 0 3-5 0 5-10 0 >10.0

PRAMP_842 Poll.: PRAMP_842-CH4[ppm] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 5.09% Calm Poll Avg: 2.03[ppm]



CH4[ppm] Calibration: PRAMP_842 Monthly: 17/11 Type: Span



—■— Span Meas —■— Span Ref —■— Span Low —■— Span High

NON-METHANE HYDROCARBON



PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

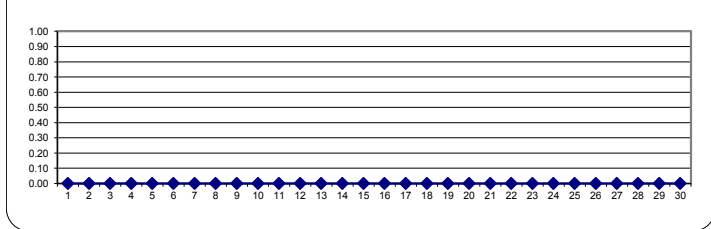
NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
2	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
3	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
4	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
5	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
6	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
7	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
8	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
9	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
10	0.00	S	0.01	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24
11	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	24
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	X	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.01	23
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	24
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	24
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	X	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	C1	C1	C1	Y	C1	C1	C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	24
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	C1	C1	C1	Y	Y	C1	C1	C1	C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
28	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
29	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
30	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
HOURLY MAX	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01				
HOURLY AVG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

24 HR AVERAGES November 2017

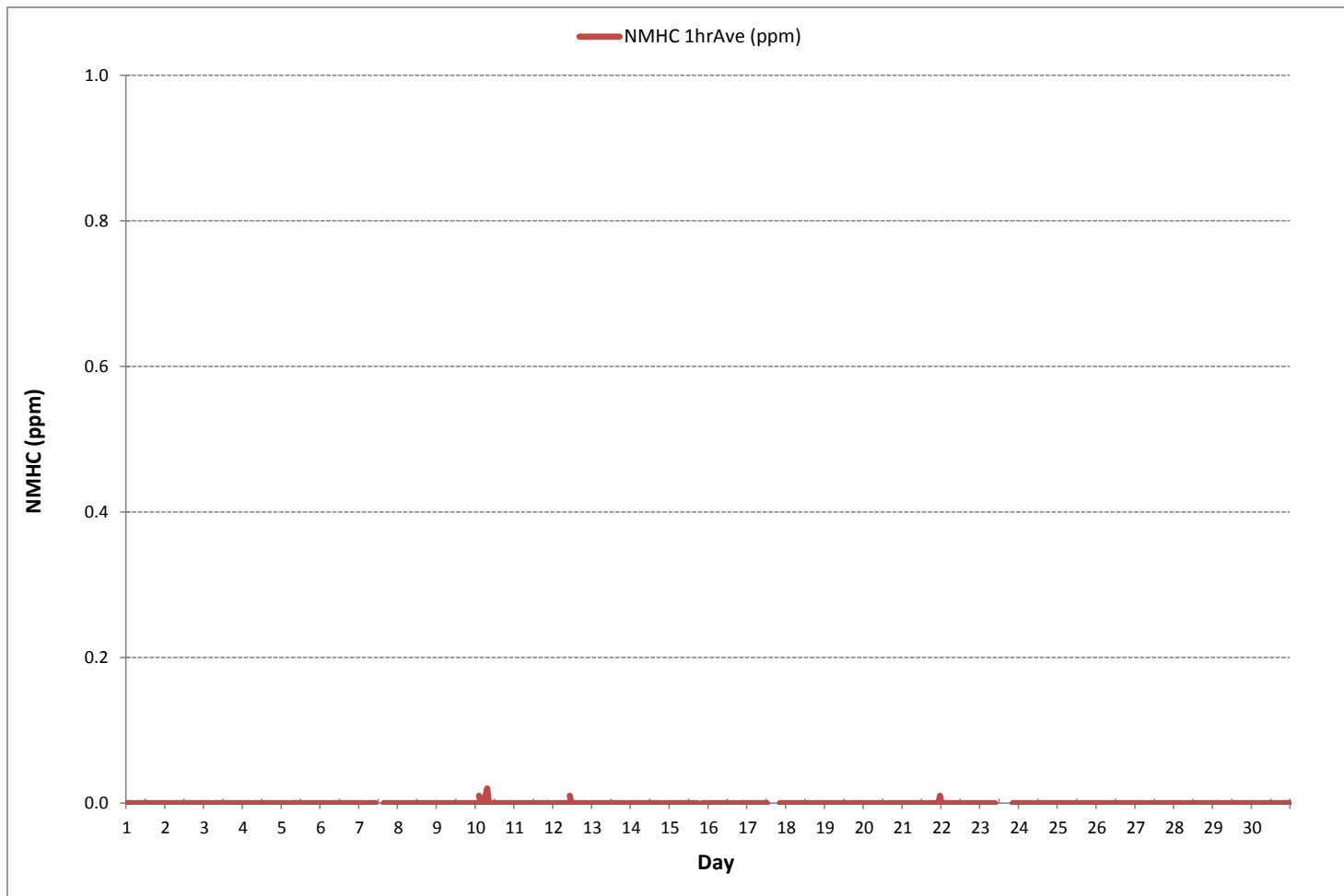


MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	5
MINIMUM 1-HR AVERAGE:	0.00 ppm @ HOUR 0 ON DAY 1
MAXIMUM 1-HR AVERAGE:	0.02 ppm @ HOUR 7 ON DAY 10
MAXIMUM 24-HR AVERAGE:	0.00 ppm ON DAY 1
IZS CALIBRATION TIME:	29 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	701 hrs
AMD OPERATION UPTIME:	97.4 %
STANDARD DEVIATION:	0.00
MONTHLY AVERAGE:	0.00 ppm



NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)





PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY 1	0.00	0.00	0.00	0.01	0.00	S	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02	0.00	0.03	0.00	24	
2	0.00	0.00	0.00	0.00	0.00	S	0.00	0.01	0.01	0.06	0.01	0.07	0.06	0.00	0.02	0.00	0.00	0.00	0.01	0.02	0.00	0.02	0.01	0.00	0.00	0.00	0.07	0.01	24
3	0.00	0.01	0.05	0.25	0.02	S	0.00	0.02	0.03	0.08	0.02	0.01	0.07	0.01	0.00	0.01	0.02	0.00	0.12	0.00	0.00	0.01	0.01	0.00	0.00	0.25	0.03	24	
4	0.16	0.00	0.00	0.01	0.05	S	0.00	0.01	0.00	0.10	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.02	0.02	0.07	0.10	0.02	0.05	0.00	0.16	0.03	24	
5	0.18	0.00	0.10	0.16	0.01	S	0.00	0.00	0.00	0.01	0.01	0.04	0.01	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.04	0.01	0.00	0.18	0.03	24	
6	0.07	0.00	0.00	0.00	0.02	S	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.07	0.09	0.00	0.01	0.00	0.09	0.02	24	
7	0.01	0.01	0.16	0.01	S	0.00	0.01	0.00	0.00	0.01	C	C	C	C	C	C	0.04	0.00	0.00	0.00	0.00	0.02	0.00	0.06	0.00	0.16	0.02	24	
8	0.08	0.00	0.02	S	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.03	0.00	0.01	0.00	0.00	0.00	0.09	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.09	0.01	24	
9	0.00	0.00	S	0.12	0.00	0.07	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.01	24	
10	0.00	S	0.06	0.00	0.00	0.00	0.29	1.07	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00	1.07	0.07	24	
11	S	0.00	0.07	0.00	0.00	0.02	0.06	0.00	0.00	0.02	0.03	0.00	0.07	0.00	0.00	0.00	0.02	0.01	0.01	0.00	0.01	0.00	0.01	S	0.00	0.07	0.02	24	
12	0.01	0.02	0.01	0.03	0.00	0.00	0.00	0.00	0.01	X	X	0.00	0.09	0.12	0.00	0.00	0.01	0.00	0.10	0.00	0.00	0.02	S	0.00	0.00	0.12	0.02	22	
13	0.00	0.02	0.00	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.05	0.00	0.01	S	0.00	0.00	0.00	0.13	0.01	24	
14	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.01	0.01	0.00	S	0.00	0.00	0.00	0.00	0.02	0.00	24	
15	0.00	0.00	0.01	0.00	0.00	0.00	0.21	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.03	0.00	X	S	0.01	0.00	0.01	0.00	0.00	0.21	0.01	23		
16	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.16	0.00	0.01	0.01	0.01	0.00	0.00	0.01	S	0.00	0.00	0.01	0.04	0.00	0.00	0.16	0.01	24	
17	0.01	0.04	0.00	0.01	0.00	0.01	0.00	0.05	0.01	0.00	0.00	0.02	0.08	C1	C1	C1	Y	C1	C1	C1	C1	0.01	0.00	0.00	0.00	0.08	0.02	16	
18	0.05	0.00	0.03	0.00	0.01	0.00	0.00	0.01	0.00	0.02	0.00	0.02	0.02	0.03	0.00	0.00	S	0.03	0.00	0.00	0.00	0.04	0.06	0.10	0.00	0.10	0.02	24	
19	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.05	0.00	0.00	0.00	0.03	0.00	0.08	0.02	S	0.00	0.04	0.10	0.07	0.16	0.04	0.13	0.09	0.00	0.16	0.04	24	
20	0.01	0.02	0.01	0.08	0.01	0.00	0.00	0.00	0.00	0.17	0.00	0.05	0.07	0.08	S	0.02	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.17	0.02	24	
21	0.02	0.01	0.02	0.16	0.03	0.01	0.00	0.02	0.00	0.08	0.12	0.00	0.01	S	0.02	0.01	0.01	0.10	0.04	0.13	0.04	0.03	0.06	0.31	0.00	0.31	0.05	24	
22	0.02	0.18	0.00	0.01	0.00	0.12	0.01	0.11	0.00	0.01	0.01	0.05	S	0.01	0.04	0.01	0.00	0.00	0.01	0.01	0.05	0.01	0.00	0.05	0.00	0.18	0.03	24	
23	0.01	0.01	0.13	0.03	0.00	0.09	0.00	0.01	0.05	0.00	C1	C1	C1	Y	Y	C1	C1	C1	C1	C1	0.00	0.01	0.00	0.00	0.00	0.13	0.02	14	
24	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	S	0.01	0.00	0.00	0.00	0.01	0.04	0.05	0.00	0.00	0.01	0.02	0.00	0.00	0.05	0.01	24		
25	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	S	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.00	0.02	0.01	0.00	0.00	0.06	0.00	0.06	0.01	24		
26	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	S	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.04	0.00	0.04	0.00	24	
27	0.00	0.01	0.00	0.02	0.00	0.00	0.02	S	0.02	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.02	0.00	0.02	0.01	0.02	0.02	0.00	0.02	0.01	24
28	0.00	0.00	0.00	0.00	0.00	0.01	S	0.01	0.01	0.00	0.00	0.00	0.11	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.11	0.01	24	
29	0.00	0.05	0.01	0.00	0.00	S	0.09	0.00	0.00	0.00	0.01	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.08	0.00	0.00	0.09	0.01	24	
30	0.00	0.02	0.01	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24	
HOURLY MAX	0.18	0.18	0.16	0.25	0.05	0.12	0.29	1.07	0.05	0.17	0.16	0.07	0.11	0.12	0.04	0.04	0.04	0.13	0.12	0.13	0.16	0.10	0.13	0.31					
HOURLY AVG	0.02	0.01	0.02	0.03	0.01	0.02	0.03	0.05	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.03					

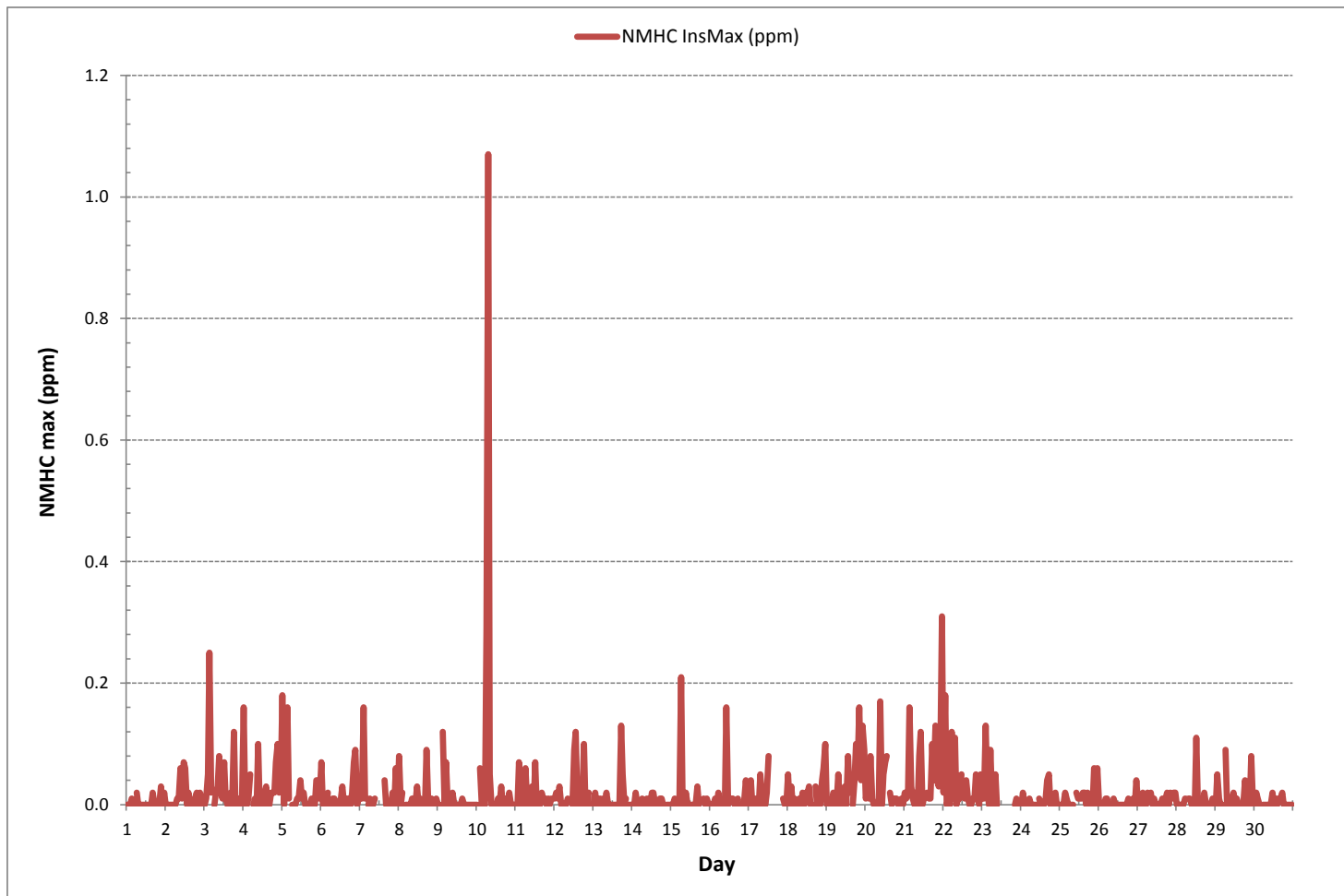
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	303
MAXIMUM INSTANTANEOUS VALUE:	1.07 ppm @ HOUR 7 ON DAY 10
IZS CALIBRATION TIME:	29 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	0.05
OPERATIONAL TIME:	699 hrs

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)



Wind: PRAMP_842
 Poll.: PRAMP_842-NMHC[ppm]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

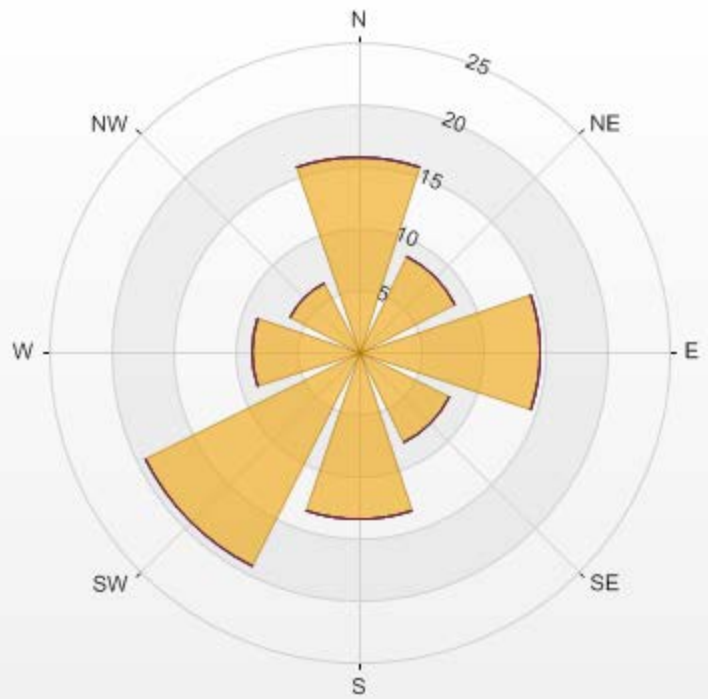
Calm: 5.09%

Calm Avg: 0.00 [ppm]

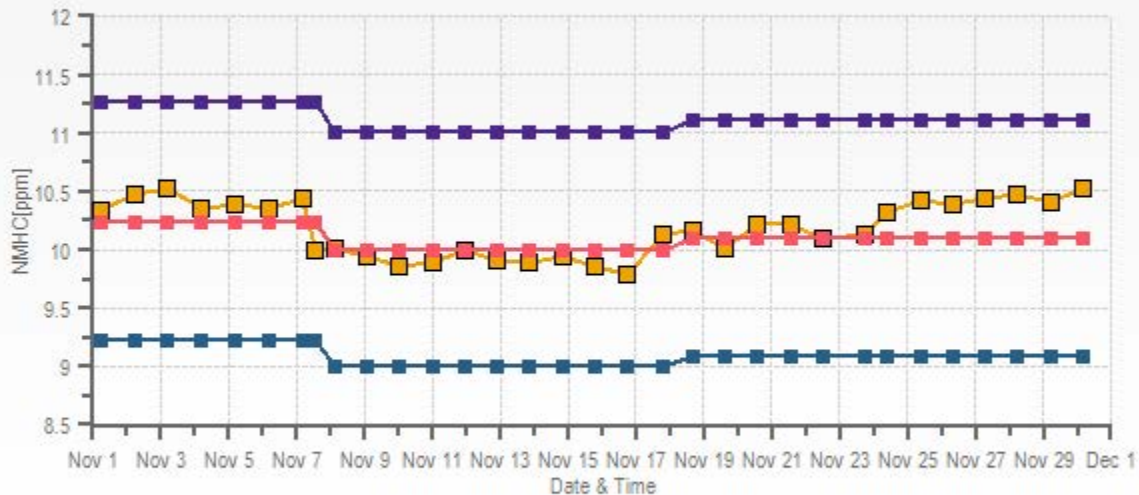
Direction	0-0.1	0.1-0.3	0.3-1	1-2	>2.0	Total
N	15.7	0.0	0.0	0.0	0.0	15.7
NE	8.7	0.0	0.0	0.0	0.0	8.7
E	14.7	0.0	0.0	0.0	0.0	14.7
SE	8.2	0.0	0.0	0.0	0.0	8.2
S	13.5	0.0	0.0	0.0	0.0	13.5
SW	19.3	0.0	0.0	0.0	0.0	19.3
W	8.7	0.0	0.0	0.0	0.0	8.7
NW	6.1	0.0	0.0	0.0	0.0	6.1
Summary	94.9	0.0	0.0	0.0	0.0	94.9

% Icon Classes (ppm) 95 0-0.1 0 0.1-0.3 0 0.3-1 0 1-2 0 >2.0

PRAMP_842 Poll.: PRAMP_842-NMHC[ppm] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 5.09% Calm Poll Avg: 0.00[ppm]



NMHC[ppm] Calibration: PRAMP_842 Monthly: 17/11 Type: Span



—■— Span Meas —■— Span Ref —■— Span Low —■— Span High

WIND SPEED



WIND SPEED Hourly Averages (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	7.8	7.5	7.3	8.3	8.9	8.9	9.2	8.5	10.5	9.4	8.8	8.5	13.1	13.6	13.6	11.7	12.0	10.5	11.0	11.3	13.9	12.1	8.7	11.1	7.3	13.9	10.1	24
2	11.2	10.4	10.4	10.3	11.9	10.2	10.0	9.3	9.2	8.8	11.0	13.8	12.7	11.6	11.1	8.4	7.2	6.5	4.1	4.1	2.5	1.6	1.9	2.1	1.6	13.8	7.9	24
3	1.7	2.3	3.2	3.2	2.3	1.0	1.9	2.9	3.8	3.5	6.1	13.5	12.7	12.2	10.0	9.3	8.4	6.6	6.2	9.6	11.0	12.3	10.8	8.3	1.0	13.5	5.6	24
4	7.4	2.0	8.1	8.3	9.6	4.5	3.9	5.3	5.9	5.5	6.5	4.0	7.0	8.2	8.2	6.2	4.8	4.2	3.0	2.8	2.8	4.2	2.9	4.0	2.0	9.6	4.6	24
5	5.0	4.0	4.5	4.8	4.1	4.1	5.8	7.0	7.0	9.5	10.0	11.4	11.1	9.0	10.4	10.1	6.7	7.7	8.0	2.4	0.8	1.5	2.9	3.9	0.8	11.4	5.1	24
6	4.6	4.0	3.8	4.8	2.9	6.9	12.6	11.0	16.4	14.0	12.9	16.6	15.3	14.1	11.9	10.7	6.1	5.1	3.1	2.4	2.7	1.0	2.3	2.3	1.0	16.6	6.5	24
7	1.3	2.4	3.4	5.5	6.1	7.3	9.6	7.6	4.6	8.9	9.4	10.8	8.5	9.3	7.1	6.6	5.5	3.4	4.2	2.5	2.6	2.4	3.0	2.9	1.3	10.8	5.1	24
8	2.7	3.6	3.5	1.2	1.5	3.6	1.7	3.2	2.9	1.9	7.0	9.0	10.0	10.1	8.6	9.1	10.1	7.1	6.9	6.1	6.1	4.9	2.8	5.2	1.2	10.1	4.2	24
9	4.5	5.0	5.8	4.3	5.4	6.2	4.3	4.7	5.8	8.6	9.8	8.0	8.0	9.1	6.9	8.6	9.3	9.8	13.9	12.7	10.6	8.6	5.2	1.6	1.6	13.9	3.7	24
10	2.8	1.6	1.0	1.3	3.6	5.5	2.5	0.9	2.7	2.3	2.8	0.6	3.9	4.3	3.4	6.0	2.5	1.3	1.9	3.9	5.1	3.8	5.1	4.4	0.6	6.0	0.2	24
11	4.6	4.6	5.7	5.3	5.9	4.4	3.0	1.0	0.6	1.6	3.0	1.6	1.1	2.3	7.9	5.7	5.2	2.6	4.5	4.3	8.0	8.9	9.2	8.6	0.6	9.2	1.3	24
12	7.3	8.6	6.2	8.9	10.1	7.5	6.4	6.6	7.2	6.6	8.8	4.5	4.8	5.6	5.5	3.6	4.5	5.8	3.4	4.0	2.1	2.3	2.7	3.9	2.1	10.1	4.3	24
13	5.2	6.2	6.3	4.6	2.8	2.3	3.0	5.0	3.3	4.7	5.3	5.7	6.3	7.8	7.5	7.6	6.9	7.9	11.3	11.3	11.3	7.8	7.9	8.5	2.3	11.3	4.6	24
14	6.6	7.3	6.1	5.7	4.8	7.1	6.0	7.3	5.0	5.6	5.0	4.7	6.4	6.4	7.5	6.4	6.3	4.6	5.2	5.5	4.8	6.7	6.9	6.2	4.6	7.5	5.6	24
15	7.2	6.6	8.0	8.7	8.9	10.1	9.3	7.8	9.0	8.6	9.5	8.1	5.8	5.4	5.8	7.0	6.0	4.4	5.1	4.4	3.4	3.1	4.2	5.0	3.1	10.1	6.4	24
16	5.8	6.0	7.3	8.5	7.8	4.0	6.9	6.4	4.7	4.8	5.7	7.6	6.9	8.4	9.5	8.6	8.7	6.6	4.8	7.3	6.8	4.7	5.7	7.1	4.0	9.5	5.2	24
17	5.3	2.8	2.1	3.0	1.0	0.7	0.4	1.1	1.2	2.1	2.7	8.3	8.0	9.6	10.9	7.7	8.2	8.3	9.0	9.0	8.5	7.1	3.5	4.3	0.4	10.9	4.0	24
18	4.7	4.7	4.2	3.9	7.3	9.3	14.1	14.0	10.9	6.9	7.2	10.0	7.6	5.1	5.7	9.6	12.0	9.3	8.1	5.4	8.1	8.0	8.0	7.1	3.9	14.1	0.6	24
19	6.9	8.1	9.4	10.9	11.3	14.7	15.2	14.0	12.0	9.6	9.7	7.1	5.6	9.5	8.3	10.8	10.3	13.1	9.8	13.6	10.2	11.7	13.1	11.2	5.6	15.2	5.2	24
20	10.9	11.6	11.5	11.7	9.6	8.1	9.9	8.6	9.7	8.3	5.8	5.5	7.5	7.7	7.2	6.4	5.7	4.1	3.5	1.0	0.4	1.5	3.4	4.4	0.4	11.7	6.0	24
21	2.7	2.5	2.5	2.1	2.8	3.9	3.3	3.4	2.5	2.9	1.5	3.2	12.3	13.6	8.8	3.5	3.6	4.2	2.3	4.3	3.4	3.4	4.5	3.2	1.5	13.6	2.4	24
22	0.4	4.7	4.0	3.1	3.4	4.1	4.4	6.9	6.2	5.9	5.8	5.0	4.2	1.7	3.9	3.0	3.0	2.5	4.2	4.8	3.1	3.4	5.2	7.1	0.4	7.1	2.7	24
23	5.9	2.7	3.7	8.9	10.2	19.3	18.0	18.2	20.8	21.4	15.5	17.4	17.7	13.8	10.9	10.8	9.2	8.0	1.7	1.5	1.5	0.9	4.1	7.1	0.9	21.4	8.7	24
24	6.2	6.9	7.1	4.1	7.1	6.6	1.7	0.9	2.5	2.2	2.7	3.2	2.9	3.4	4.0	4.8	4.6	6.6	7.6	8.9	10.1	19.4	18.0	15.5	0.9	19.4	2.7	24
25	17.4	16.3	16.7	12.8	7.4	11.3	10.4	10.4	11.5	9.8	10.7	8.8	10.1	8.2	7.4	7.7	7.1	7.0	5.5	5.9	5.5	5.3	5.9	6.7	5.3	17.4	4.9	24
26	5.8	5.4	7.7	10.2	11.3	12.6	13.0	15.8	17.0	17.7	20.5	17.0	13.9	12.5	13.2	12.8	10.9	8.2	9.7	8.6	4.0	2.4	3.3	2.9	2.4	20.5	10.2	24
27	2.3	4.9	5.2	5.1	4.1	5.7	3.9	3.3	3.8	7.0	10.4	9.3	10.3	11.9	12.8	12.5	12.0	8.7	6.0	8.7	10.5	10.7	11.7	5.3	2.3	12.8	4.2	24
28	8.3	6.2	12.2	8.6	11.9	12.1	6.8	9.0	11.1	11.1	10.8	5.0	6.9	7.4	10.8	4.5	8.3	10.6	11.4	8.8	5.7	5.1	12.2	6.8	4.5	12.2	8.3	24
29	12.2	12.7	9.3	8.1	9.6	5.8	7.5	5.6	5.5	7.4	9.1	8.4	11.9	10.8	16.3	18.3	17.0	18.7	21.8	21.8	19.9	19.7	22.2	16.2	5.5	22.2	12.7	24
30	15.5	17.4	10.5	13.1	13.1	13.9	13.6	14.8	12.1	11.2	15.2	19.1	16.3	16.2	14.3	15.2	15.3	14.0	6.6	2.7	9.3	15.8	16.8	9.4	2.7	19.1	12.7	24
HOURLY MAX	17.4	17.4	16.7	13.1	13.1	19.3	18.0	18.2	20.8	21.4	20.5	19.1	17.7	16.2	16.3	18.3	17.0	18.7	21.8	21.8	19.9	19.7	22.2	16.2				
HOURLY AVG	0.9	0.8	0.8	0.7	0.4	0.5	0.5	0.9	1.4	1.0	0.9	2.2	3.3	3.4	2.8	2.5	1.8	1.5	1.0	1.2	1.3	1.5	1.5	0.7				

STATUS FLAG CODES

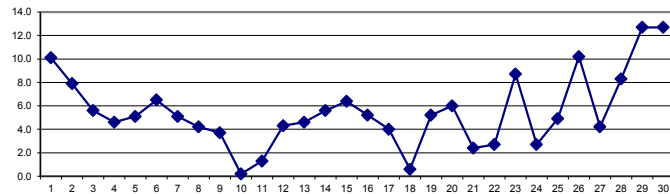
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	August 30, 2017
DECLINATION :	MAGNETIC DECLINATION 15 DEGREE EAST

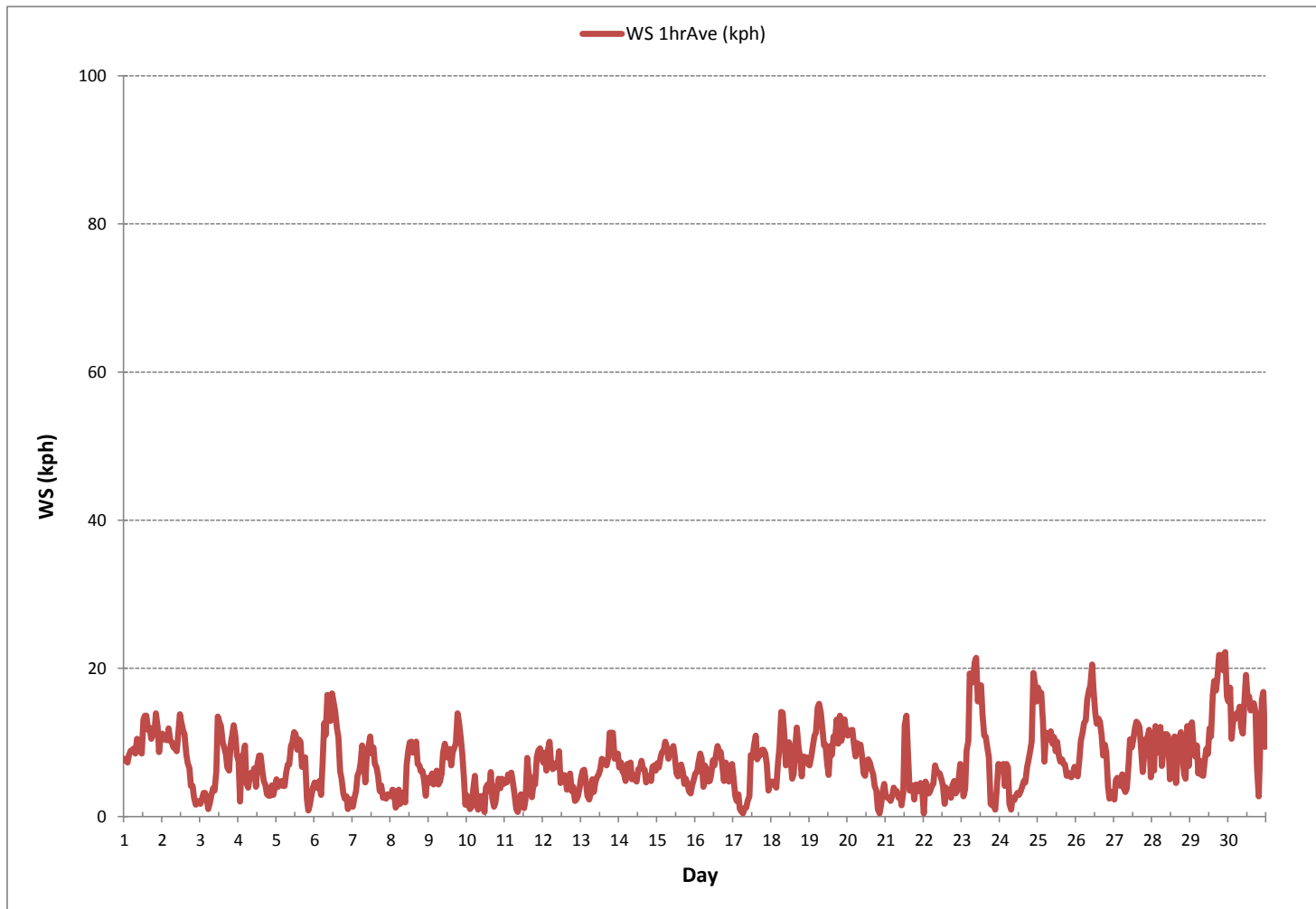
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	720
MINIMUM 1-HR AVERAGE	0.4 kph @ HOUR 6 ON DAY 17
MAXIMUM 1-HR AVERAGE:	22.2 kph @ HOUR 22 ON DAY 29
MAXIMUM 24-HR AVERAGE:	12.7 kph ON DAY 29
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	720 hrs
AMSD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	4.2
MONTHLY AVERAGE:	1.1 kph

24 HR AVERAGES November 2017



WIND SPEED Hourly Averages (WS kph)





PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	19.8	20.8	20.4	23.2	20.7	22.7	20.7	24.9	23.4	22.1	20.2	18.9	33.8	34.8	39.8	33.1	29.0	27.2	29.2	27.6	33.5	35.3	23.1	27.5	18.9	39.8	26.3	24
2	29.7	22.3	22.7	23.4	27.6	25.3	25.5	22.8	23.3	22.6	27.5	31.0	28.0	26.2	22.2	18.7	16.2	15.8	12.0	9.8	7.1	3.9	5.3	5.4	3.9	31.0	19.8	24
3	3.7	4.2	6.1	5.9	5.6	3.1	4.0	5.3	6.9	7.0	15.3	25.2	22.7	22.7	19.3	16.3	14.4	13.4	11.2	18.9	19.7	20.2	18.7	15.0	3.1	25.2	12.7	24
4	16.8	6.0	15.9	13.1	16.7	9.4	8.1	9.8	10.0	11.2	11.5	7.9	11.6	12.4	11.9	10.8	8.1	7.4	5.5	5.7	6.2	10.2	6.8	7.6	5.5	16.8	10.0	24
5	9.3	7.0	9.2	8.7	7.9	7.8	13.7	14.6	16.6	21.1	22.6	26.0	24.2	20.4	20.8	19.1	12.9	14.8	14.1	9.6	4.6	4.2	5.3	6.7	4.2	26.0	13.4	24
6	8.7	7.7	8.9	9.7	9.4	17.7	26.6	22.3	29.6	33.7	24.5	33.2	28.1	25.5	20.7	18.2	11.9	11.2	6.0	5.8	5.7	4.7	6.5	7.0	4.7	33.7	16.0	24
7	4.9	9.6	9.2	16.1	17.3	20.9	22.8	20.4	12.1	23.1	23.0	25.6	19.9	23.5	15.8	14.6	11.6	9.3	8.9	7.6	6.5	4.4	5.4	6.0	4.4	25.6	14.1	24
8	6.8	8.3	10.1	3.4	4.6	6.7	3.5	9.0	7.9	7.3	13.7	14.3	15.0	17.8	15.4	20.4	19.3	15.6	12.9	12.7	12.9	9.0	8.1	9.9	3.4	20.4	11.0	24
9	9.2	7.8	9.1	10.1	10.1	10.6	8.8	10.9	18.6	19.7	23.0	20.3	20.6	16.1	13.5	14.4	18.8	21.7	23.4	25.2	17.7	15.4	14.4	6.0	6.0	25.2	15.2	24
10	5.7	4.7	4.2	5.8	13.4	12.9	7.7	6.3	7.0	7.0	6.8	5.9	8.5	10.2	11.3	9.6	6.7	4.1	7.0	8.3	11.0	10.0	11.4	10.3	4.1	13.4	8.2	24
11	8.1	12.3	10.4	9.7	10.0	8.6	8.6	5.0	4.5	5.4	7.0	5.6	4.1	14.4	17.7	13.8	12.8	8.6	10.2	12.1	17.1	28.1	22.2	18.1	4.1	28.1	11.4	24
12	15.5	18.4	18.7	20.1	23.0	20.9	16.4	15.8	17.8	17.2	20.9	14.7	9.8	13.7	14.5	9.3	10.9	14.1	8.3	8.6	9.0	6.3	5.8	10.2	5.8	23.0	14.2	24
13	10.1	12.6	11.9	10.2	7.6	7.0	11.2	11.0	8.3	10.2	13.3	12.5	13.6	18.8	18.3	16.8	14.1	22.5	30.4	27.0	24.8	17.9	17.7	17.2	7.0	30.4	15.2	24
14	13.5	15.8	14.2	19.9	15.8	17.0	12.8	16.0	10.8	11.9	11.9	14.8	15.8	14.0	16.8	17.4	13.8	10.4	11.5	11.1	11.6	17.9	16.3	15.1	10.4	19.9	14.4	24
15	18.7	15.3	18.7	18.5	20.8	22.8	20.9	19.4	23.6	18.1	20.0	18.1	14.6	12.9	16.8	17.2	17.6	11.2	12.7	10.8	7.8	6.7	11.5	12.4	6.7	23.6	16.1	24
16	12.9	14.1	15.0	16.1	17.0	10.0	13.6	12.4	8.2	8.7	10.9	13.3	15.4	15.5	18.8	15.2	15.4	11.7	10.0	13.6	11.2	9.0	10.6	11.5	8.2	18.8	12.9	24
17	10.3	8.0	5.4	6.1	6.5	2.9	2.3	2.9	3.2	5.4	9.4	13.4	12.7	16.4	18.1	14.7	12.2	13.6	16.2	15.0	14.4	15.6	8.0	8.0	2.3	18.1	10.0	24
18	8.9	9.7	9.0	10.9	16.4	17.9	22.7	24.6	21.1	16.6	21.4	22.2	17.9	10.7	10.4	25.7	26.3	26.2	19.3	11.9	17.6	17.8	18.0	17.1	8.9	26.3	17.5	24
19	14.4	23.0	24.7	28.7	27.9	35.2	37.8	34.4	31.6	25.3	24.6	19.0	13.7	18.7	18.4	21.4	22.2	26.2	22.1	31.6	21.7	26.5	30.6	20.8	13.7	37.8	25.0	24
20	20.7	27.6	20.4	19.3	18.0	14.2	17.0	16.0	18.1	14.3	13.1	10.2	11.4	12.5	12.3	10.1	11.1	8.7	6.4	4.2	3.8	4.6	9.6	8.4	3.8	27.6	13.0	24
21	8.4	6.1	8.1	6.1	8.5	10.1	8.8	8.5	6.9	11.5	16.2	7.8	27.1	24.7	17.6	8.4	7.8	8.0	7.1	10.5	7.3	6.5	8.9	6.5	6.1	27.1	10.3	24
22	5.1	9.6	7.5	8.2	6.5	10.5	11.5	11.0	11.0	10.8	10.5	11.8	10.7	5.0	10.0	11.3	7.5	6.9	8.2	10.0	10.2	11.4	16.0	17.4	5.0	17.4	9.9	24
23	16.6	8.4	12.8	25.9	23.4	43.0	35.7	34.2	36.9	35.9	26.4	31.2	33.1	29.4	19.6	21.1	19.6	16.5	6.6	3.8	10.3	8.5	7.6	12.1	3.8	43.0	21.6	24
24	11.2	15.9	15.0	9.9	16.3	16.3	6.7	3.4	6.4	5.2	5.8	7.2	8.1	7.3	8.6	12.4	11.5	16.1	15.5	18.6	19.9	32.2	31.6	30.6	3.4	32.2	13.8	24
25	30.1	32.5	30.6	25.3	22.7	26.2	24.2	29.3	28.7	25.7	23.7	19.1	21.7	20.1	15.0	16.7	15.2	15.7	14.3	14.9	13.3	11.9	13.7	14.5	11.9	32.5	21.0	24
26	13.8	15.3	19.5	25.1	28.3	31.0	30.3	39.8	40.7	38.9	55.5	45.3	33.8	30.9	32.8	30.4	27.4	23.9	24.0	22.6	16.0	8.3	9.1	10.9	8.3	55.5	27.2	24
27	7.4	11.5	11.6	10.3	8.5	11.1	9.2	6.0	8.8	15.5	20.5	18.1	17.0	18.3	21.4	20.6	20.9	15.4	12.7	20.5	18.4	15.9	18.0	11.3	6.0	21.4	14.5	24
28	15.0	14.5	21.3	16.4	19.0	21.5	14.3	18.0	20.7	21.5	17.4	14.8	17.9	17.3	21.4	13.7	16.6	21.4	22.0	22.0	11.1	10.1	25.5	12.6	10.1	25.5	17.8	24
29	21.9	21.8	18.0	17.6	17.0	13.6	21.6	17.0	14.6	12.5	15.0	17.9	19.9	19.3	27.7	33.4	31.9	30.4	40.5	37.6	35.2	34.6	38.2	41.5	12.5	41.5	24.9	24
30	31.1	27.2	20.6	26.6	24.0	24.6	23.2	27.7	23.9	21.0	28.6	33.1	27.0	29.9	24.4	26.2	27.3	24.4	19.2	14.8	26.1	28.4	29.2	25.1	14.8	33.1	25.6	24
HOURLY MAX	31.1	32.5	30.6	28.7	28.3	43.0	37.8	39.8	40.7	38.9	55.5	45.3	33.8	34.8	39.8	33.4	31.9	30.4	40.5	37.6	35.2	35.3	38.2	41.5				
HOURLY AVG	13.6	13.9	14.3	15.0	15.7	16.7	16.3	16.6	16.7	16.9	18.7	18.6	18.6	18.6	18.4	17.7	16.4	15.7	14.9	15.1	14.4	14.5	15.1	14.1				

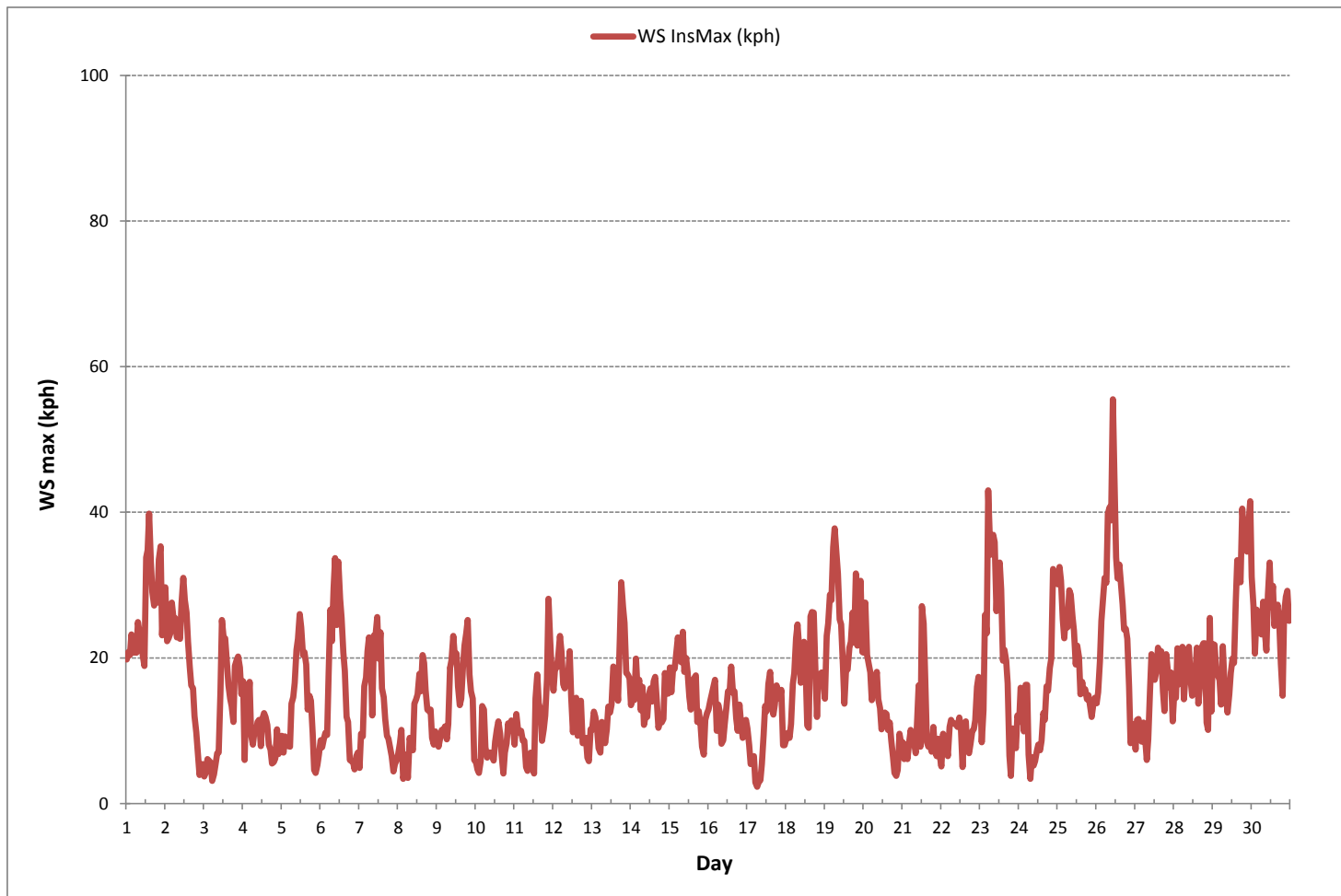
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	55.5	kph	@ HOUR	10	ON DAY	26	
OPERATIONAL TIME:						720	hrs



WIND SPEED Instantaneous Maximum (WS kph)



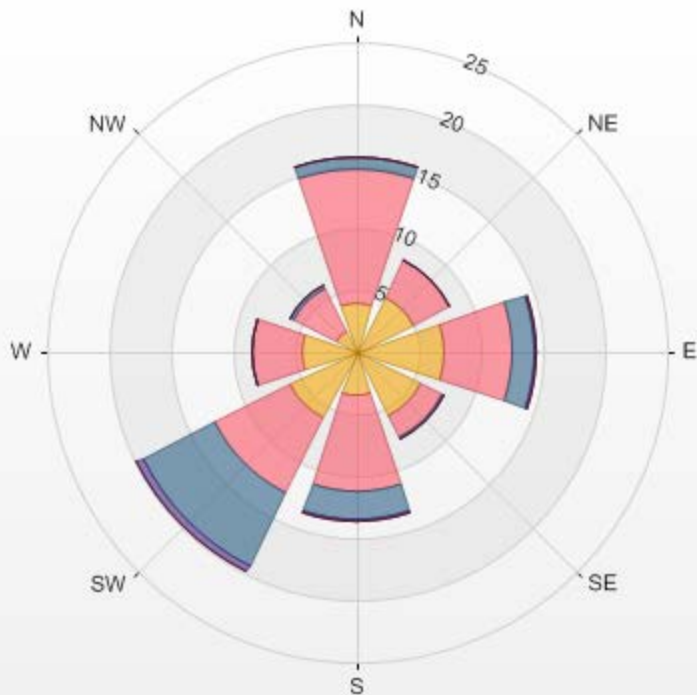
Wind: PRAMP_842
 Monitor: WSP [kph]
 Monthly: 17/11
 Type: WindRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 5.42%

Direction	1.8-6.0	6.0-12.0	12.0-20.0	20.0-29.0	29.0-39.0	>39.0	Total
N	3.9	10.8	1.0	0.0	0.0	0.0	15.7
NE	5.0	3.3	0.0	0.0	0.0	0.0	8.3
E	7.1	5.6	1.7	0.1	0.0	0.0	14.5
SE	5.8	1.9	0.1	0.0	0.0	0.0	7.9
S	3.6	7.6	2.4	0.1	0.0	0.0	13.8
SW	6.0	6.8	6.5	0.6	0.0	0.0	19.9
W	4.4	4.0	0.0	0.0	0.0	0.0	8.5
NW	1.8	3.9	0.4	0.0	0.0	0.0	6.1
Summary	37.6	44.0	12.1	0.8	0.0	0.0	94.6

% Icon	Classes (kph)	38		1.8-6.0	44		6.0-12.0	12		12.0-20.0	1		20.0-29.0	0		29.0-39.0	0		>39.0
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PRAMP_842 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 5.42% Calm Wind Avg Speed: 1.19(kph)



WIND DIRECTION



PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

WIND DIRECTION Hourly Averages (WD)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24-HOUR AVG	24-HR	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	QUADRANT	RDGS.	
DAY																											
1	N	N	N	N	N	N	N	NNW	N	N	N	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	N	N	N	NNW	N	24	
2	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	N	N	N	N	N	N	NNW	N	N	NNE	NNW	NNE	ESE	SE	ESE	ESE	N	24	
3	ESE	ESE	ESE	ESE	E	ESE	ESE	ESE	ESE	SE	S	SSW	SSW	SSW	SSW	SSW	SSE	SE	SSE	SSE	SSE	SSE	S	S	24		
4	S	S	S	SSE	SSE	S	S	S	S	SSW	S	SSW	WNW	WNW	WNW	W	W	WSW	WSW	SW	S	SW	WSW	WSW	SSW	24	
5	WSW	WSW	WSW	WNW	WNW	WNW	WNW	WNW	NW	NW	NW	NNW	NW	WNW	WNW	WNW	WNW	WNW	WNW	W	SE	ESE	ESE	ESE	WNW	24	
6	ESE	ESE	SE	SSE	SSE	SSE	S	SSW	SSW	SSW	SSW	SSW	SW	SW	SSW	SW	SW	WNW	NW	NW	NNW	WSW	NNW	SSW	24		
7	NW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	N	N	NNW	N	NNW	NNW	NNW	N	NNW	NNE	E	ESE	ESE	ESE	N	24		
8	ESE	SSE	SSE	SSE	SSE	SSW	S	S	SSE	SE	WSW	SW	WSW	WSW	SSW	S	SSW	S	SSE	SE	SE	ESE	SE	ESE	S	24	
9	E	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	SE	SE	S	W	W	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	S	WSW	24		
10	WSW	W	W	WNW	NW	NW	WNW	NNW	WNW	WNW	WNW	SSW	SE	SE	SSE	SE	ESE	SSE	E	ESE	SE	SE	ESE	ESE	SSW	24	
11	SE	N	SE	S	SW	S	S	SE	SE	SE	WSW	WNW	NW	N	NNW	NNW	NW	N	SSE	NE	NNE	NNE	NNE	NNE	NNW	24	
12	NNE	NE	NE	ENE	ENE	ENE	E	ENE	E	E	ESE	E	NE	ENE	ENE	E	ESE	ESE	ESE	E	NNE	NE	WSW	WSW	E	24	
13	SW	WSW	WSW	WSW	WNW	WNW	ENE	NE	NE	NNE	NNE	NNE	NNE	N	NNE	N	NNE	NE	NNE	NNE	NNE	NNE	N	NNE	NNE	24	
14	N	N	NNE	NE	NNW	NE	NE	NE	NE	NNE	NE	ENE	ENE	ENE	ENE	ENE	ENE	NE	NE	ENE	ENE	ENE	ENE	ENE	ENE	24	
15	ENE	ENE	ENE	E	E	ENE	E	ENE	E	E	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	NE	NE	NNE	N	NNW	ENE	24		
16	NNW	NNW	NW	NW	NW	WNW	W	SSE	S	W	W	W	WSW	SW	SW	SW	SW	WSW	WSW	WSW	WSW	WSW	WNW	W	24		
17	WNW	WNW	W	SSW	SSE	SSE	SSE	ESE	SE	SE	SSE	S	SSW	SSW	SSW	S	SSE	SSE	SSE	SSE	SSE	SSE	SE	SSE	S	24	
18	SE	S	SE	SE	SE	SE	SSE	SSE	S	W	SW	W	W	WNW	WNW	NNW	NNW	N	N	NNW	N	N	N	N	S	24	
19	NNE	NE	ENE	ENE	E	E	E	E	E	E	E	E	NNE	N	NNW	NW	NW	NW	NW	NNW	NW	WNW	WNW	NNW	NNE	24	
20	WNW	WNW	WNW	WNW	W	W	W	WNW	WNW	WNW	W	WNW	WNW	WNW	W	W	W	WNW	WSW	NE	S	SSE	SSE	SSE	W	24	
21	SSE	SE	SE	SE	ESE	SE	E	ESE	ENE	ESE	SSE	SE	SSW	SSW	SW	SW	SSW	SW	SW	WSW	SW	WSW	WNW	WNW	SSW	24	
22	S	S	SSW	SSW	WSW	SSW	S	S	S	S	SSE	SE	SE	E	ENE	E	ENE	ENE	E	E	E	E	E	E	SE	24	
23	ESE	ESE	ESE	SE	SSW	SSW	SSW	SSW	SSW	SSW	SW	WSW	WSW	WNW	WNW	WNW	NNW	NNE	NE	NNW	N	NW	NNW	NNW	SW	24	
24	NNW	NNW	NNW	NNW	NNW	NNW	NNW	SSE	E	SE	ESE	E	E	ESE	E	ESE	ESE	ESE	ESE	SE	SE	SE	S	S	SE	24	
25	SSW	SW	SW	W	NNW	NNW	NNW	NNW	N	NNW	NNW	N	NNW	NNW	NNW	NNW	N	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNW	24	
26	NNE	NE	ENE	ENE	E	ENE	E	E	E	E	E	E	ESE	ESE	ESE	E	E	E	ESE	ESE	E	NE	NE	E	E	24	
27	N	N	NW	WNW	WNW	NW	WNW	NW	NW	WNW	WNW	WNW	W	WSW	SW	SSW	S	S	SSE	SSE	SE	S	SSE	S	SW	24	
28	S	SSW	S	S	SSW	SSW	S	SE	SSE	SE	SSE	S	SSE	S	S	S	S	S	S	S	S	SSW	SSW	SSW	SSW	S	24
29	SSW	SW	SW	SW	WSW	SW	ESE	ESE	ESE	SE	S	SSW	SSW	SW	SSW	SW	SSW	SSW	SSW	SW	SSW	SW	SW	SSW	SW	24	
30	SW	SW	S	SSE	S	SSW	SSW	SW	SW	SW	SW	SW	SW	SSW	SSW	SSW	S	S	SSW	SSW	SW	SW	SSW	SSW	SSW	SSW	24

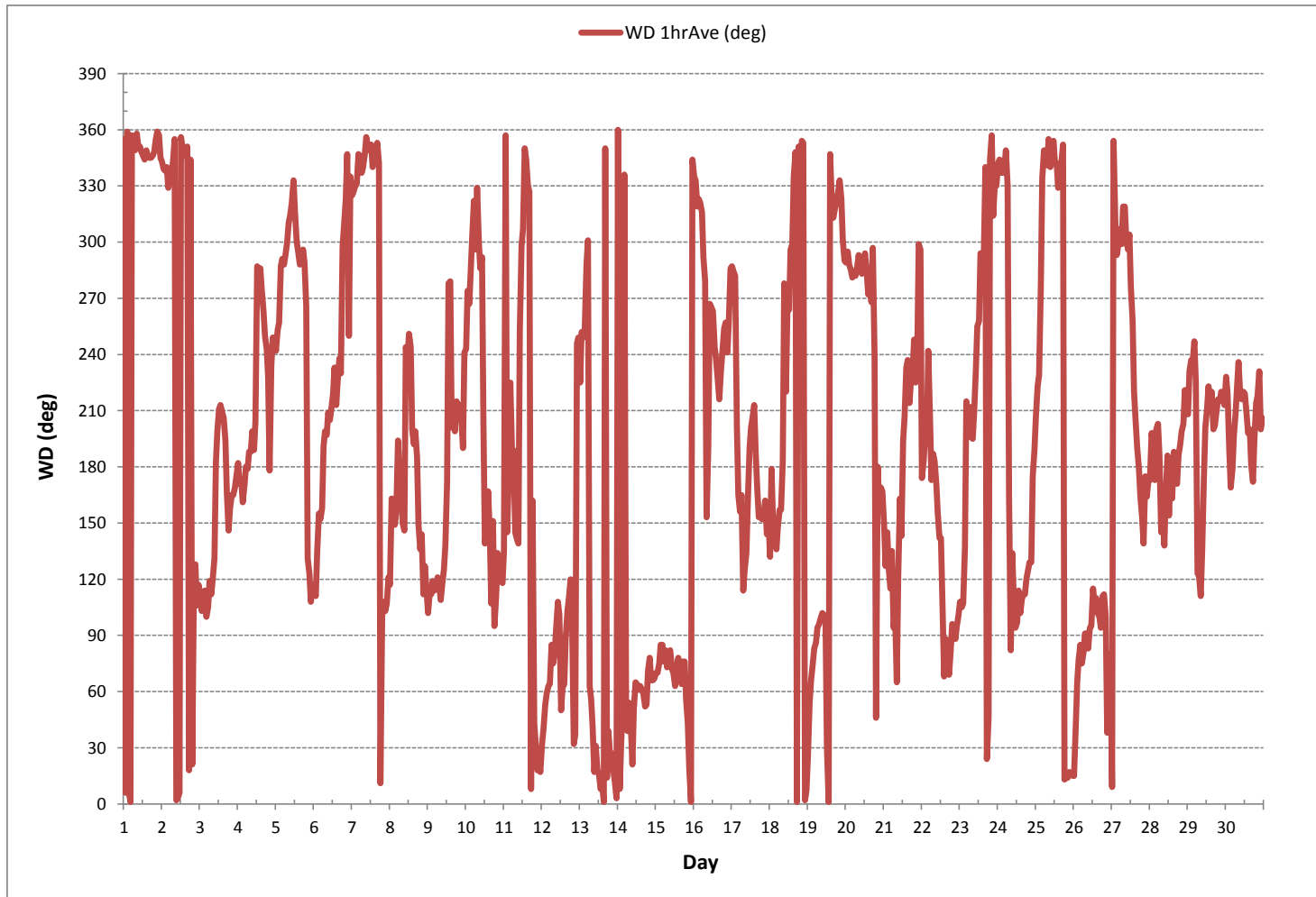
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	August 30, 2017
DECLINATION :	MAGNETIC DECLINATION 15 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	720	hrs
STANDARD DEVIATION:	101		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	213 (SSW)	

WIND DIRECTION Hourly Averages (WD)



RELATIVE HUMIDITY



PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

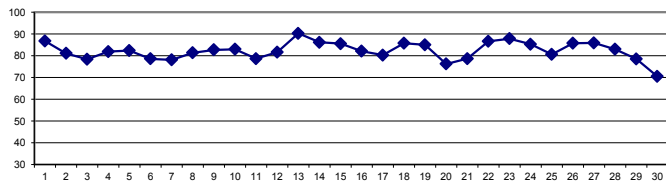
RELATIVE HUMIDITY Hourly Averages (RH %)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	93	92	93	91	90	89	90	91	90	89	85	86	87	88	83	83	78	79	82	85	84	82	86	88	78	93	87	24
2	87	87	87	87	87	88	88	87	86	83	78	70	71	74	71	72	75	77	78	79	82	86	84	83	70	88	81	24
3	82	81	80	80	81	81	80	79	81	82	78	76	74	72	69	67	70	77	81	81	82	83	82	82	67	83	78	24
4	82	83	84	82	82	82	83	84	84	79	76	69	70	75	76	78	80	85	87	88	88	89	90	91	69	91	82	24
5	91	91	92	92	91	91	91	89	89	85	78	64	61	64	69	81	76	76	77	83	87	87	86	87	61	92	82	24
6	88	88	87	88	87	87	84	79	78	75	73	66	65	66	66	64	66	72	79	84	85	86	87	87	64	88	79	24
7	87	88	91	90	88	87	84	79	80	77	72	65	62	63	63	67	70	73	75	79	83	84	84	84	62	91	78	24
8	84	83	84	84	84	84	85	86	86	75	78	77	74	73	72	73	77	83	86	87	87	84	84	84	72	87	81	24
9	83	83	85	85	84	86	86	86	87	83	79	70	69	77	76	80	83	84	85	87	86	87	87	87	69	88	83	24
10	88	88	88	88	86	83	84	86	88	86	80	78	81	81	72	74	77	83	87	84	79	83	84	85	72	88	83	24
11	83	87	89	90	89	89	88	85	84	84	84	76	68	59	54	64	71	75	77	75	76	78	81	82	54	90	79	24
12	82	83	84	83	84	83	83	83	83	79	76	75	72	71	72	73	75	86	89	87	86	88	91	91	71	91	82	24
13	94	93	92	92	91	90	90	90	90	90	91	91	90	90	90	90	90	90	89	89	89	89	89	89	89	94	90	24
14	89	89	89	88	88	88	87	87	87	86	84	84	82	82	83	85	86	87	87	87	87	85	85	86	82	89	86	24
15	86	86	86	86	86	86	86	85	85	85	85	86	85	82	81	82	86	88	87	87	88	87	86	87	81	88	86	24
16	87	86	86	86	85	85	85	83	83	82	77	77	79	77	75	74	79	84	84	83	84	84	84	83	74	87	82	24
17	83	83	83	83	82	82	81	80	79	78	69	80	73	74	77	78	82	82	81	80	80	84	85	88	69	88	80	24
18	88	87	87	87	86	85	87	88	88	87	86	78	79	80	81	82	84	85	87	88	90	84	89	89	78	90	86	24
19	88	88	87	87	87	87	85	85	85	86	87	88	87	87	87	86	86	86	85	83	81	80	77	76	76	88	85	24
20	76	76	76	77	78	77	76	76	76	77	76	70	70	71	73	73	76	77	77	77	80	81	81	83	70	83	76	24
21	84	84	82	80	80	81	81	82	82	81	75	69	70	72	75	76	78	79	80	78	78	79	81	81	69	84	79	24
22	80	81	78	78	79	79	81	82	84	85	85	89	91	88	88	90	92	93	93	94	93	92	92	92	78	94	87	24
23	92	92	94	94	90	88	87	87	85	82	78	78	82	82	84	85	85	91	92	94	94	96	96	78	96	88	24	
24	96	94	94	93	92	91	88	90	89	89	76	71	79	79	80	87	90	89	88	85	84	78	74	72	71	96	85	24
25	70	75	77	81	83	85	86	87	88	86	79	73	72	72	73	75	79	81	83	86	86	86	86	86	70	88	81	24
26	86	86	84	84	84	85	85	86	85	86	88	88	83	83	84	86	87	87	87	88	88	89	88	83	89	89	86	24
27	89	88	88	88	89	89	88	89	89	89	86	86	86	86	85	82	81	82	82	83	81	83	85	87	81	89	86	24
28	90	88	90	90	89	88	89	89	85	83	83	77	75	72	76	79	83	81	79	79	86	87	76	79	72	90	83	24
29	75	78	81	84	87	91	91	90	90	92	90	85	76	74	72	69	70	71	70	68	70	69	70	72	68	92	79	24
30	75	74	76	73	70	70	72	71	72	68	66	66	62	63	64	67	70	71	75	82	75	68	68	74	62	82	71	24
HOURLY MAX	96	94	94	94	92	91	91	91	90	92	91	91	91	90	90	90	92	93	93	94	94	94	96	96				
HOURLY AVG	85	85	86	86	85	85	85	85	85	83	80	77	76	76	76	77	79	82	83	84	84	84	84	85				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

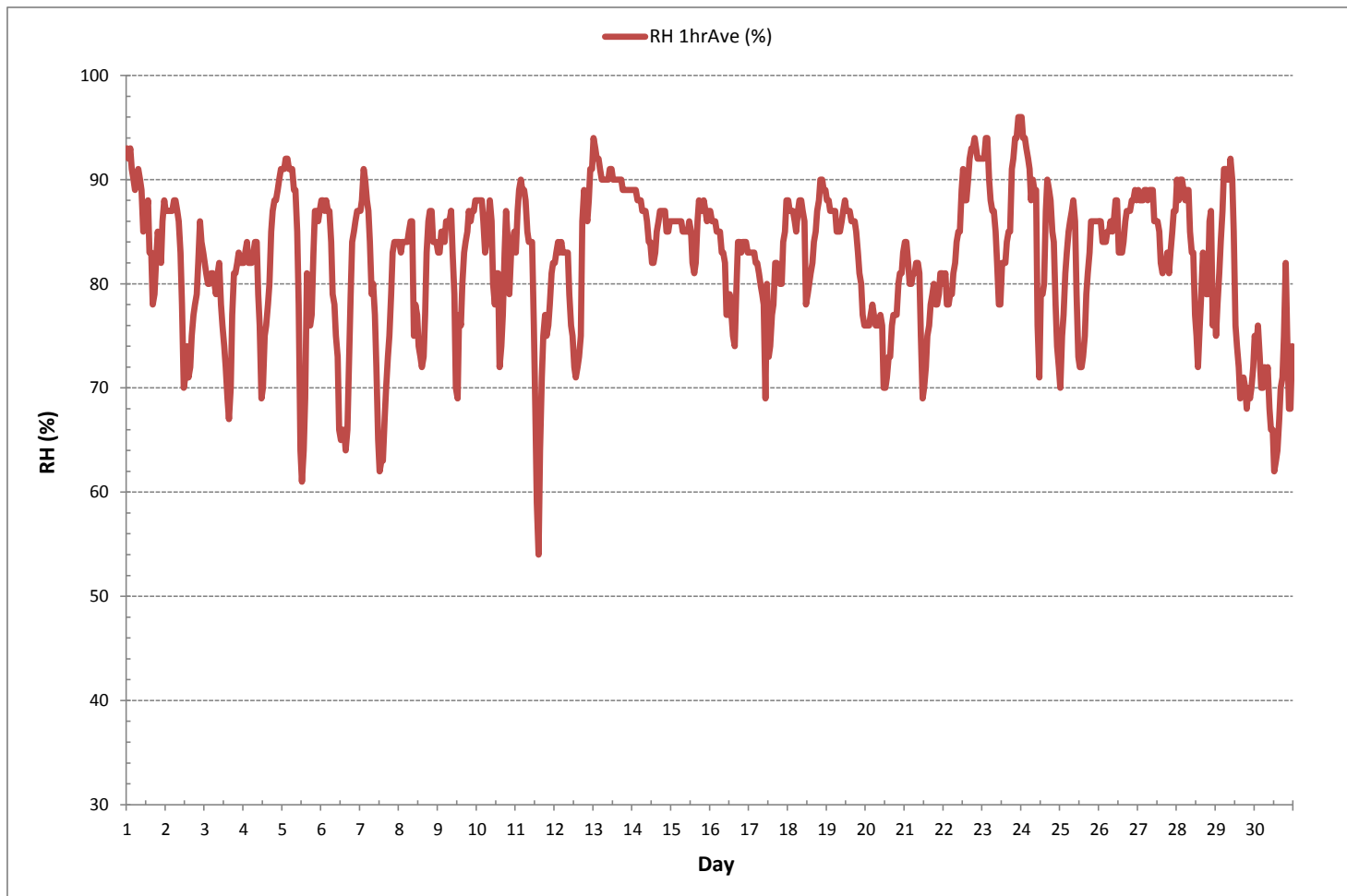
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	54	%	@ HOUR	14	ON DAY	11
MAXIMUM 1-HR AVERAGE:	96	%	@ HOUR	22	ON DAY	23
MAXIMUM 24-HR AVERAGE:	90	%			ON DAY	13
OPERATIONAL TIME:						720 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	7					
MONTHLY AVERAGE:						82 %

RELATIVE HUMIDITY Hourly Averages (RH %)



BAROMETRIC PRESSURE



PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

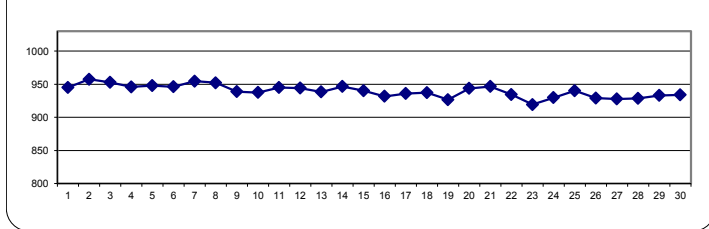
BAROMETRIC PRESSURE Hourly Averages (BP mbar)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	938	938	939	939	940	940	941	942	942	943	944	944	944	945	946	947	948	949	950	950	951	952	953	953	938	953	945	24	
2	954	954	955	955	955	956	956	956	957	957	957	957	958	958	958	959	959	959	960	960	960	960	960	960	954	960	958	24	
3	959	959	958	958	957	957	956	956	956	955	954	953	952	952	951	950	949	950	949	949	948	948	947	947	947	947	959	953	24
4	947	947	946	946	946	946	946	946	946	945	945	945	945	945	945	945	946	946	946	946	946	946	947	947	947	945	947	946	24
5	947	947	947	947	947	947	947	947	948	948	948	948	948	948	948	948	948	948	948	948	948	949	949	949	949	947	949	948	24
6	948	948	948	947	947	946	945	945	944	944	944	943	944	944	944	944	945	946	947	948	949	949	950	950	943	943	950	946	24
7	951	952	953	953	953	954	955	955	956	956	956	956	956	956	955	955	955	955	955	955	955	955	955	955	951	956	955	24	
8	955	954	954	954	954	953	953	953	953	952	952	952	952	952	952	952	952	952	952	951	950	950	949	949	949	949	955	952	24
9	949	948	947	945	945	944	942	942	940	938	937	936	935	935	935	935	934	935	934	935	935	935	935	936	934	949	939	939	24
10	936	936	937	937	937	937	938	938	938	938	938	938	938	938	937	937	937	937	938	938	938	937	938	938	936	938	938	24	
11	938	938	939	939	940	941	942	943	944	945	945	946	946	946	947	948	948	949	949	949	949	950	950	951	938	951	945	24	
12	951	951	951	950	950	949	949	948	947	947	945	944	943	942	941	941	941	940	939	939	939	939	939	939	939	939	951	944	24
13	939	939	939	939	939	939	939	939	939	938	938	938	937	937	937	937	937	937	938	938	938	939	939	940	941	937	941	938	24
14	941	942	942	943	945	945	945	946	946	947	947	948	948	948	948	948	949	949	949	949	949	949	948	948	941	949	947	24	
15	948	947	946	946	945	945	944	944	943	942	941	941	939	939	938	937	936	935	935	934	935	934	934	933	933	933	948	940	24
16	933	933	933	932	932	932	932	932	932	932	931	931	931	931	930	930	931	932	932	932	932	932	932	932	930	933	932	24	
17	933	933	933	934	934	934	934	935	936	935	935	935	936	936	937	937	938	938	939	939	939	939	939	939	933	939	936	24	
18	939	939	939	938	938	937	936	935	935	935	935	935	935	935	936	936	937	937	938	939	939	939	939	938	937	935	939	937	24
19	937	935	934	933	931	929	928	927	925	924	923	921	921	921	920	921	922	923	924	925	927	928	929	930	920	937	927	24	
20	931	932	933	935	936	937	939	940	941	943	943	944	944	946	947	948	950	950	951	951	952	952	953	953	931	953	944	24	
21	953	953	953	953	952	952	951	950	950	949	947	947	946	946	945	945	944	943	942	941	940	940	940	940	940	940	953	947	24
22	940	939	939	939	939	939	939	939	938	938	937	936	935	935	934	933	932	931	930	929	927	926	926	924	924	940	934	24	
23	923	922	921	920	919	919	918	917	917	916	917	917	918	918	918	919	919	920	920	920	921	922	923	916	923	919	24		
24	924	925	926	926	928	929	930	931	932	932	932	932	932	932	931	931	931	931	930	929	929	929	929	924	932	930	24		
25	930	931	932	933	934	935	936	937	939	940	941	942	943	943	944	944	945	945	945	945	945	945	944	943	930	945	940	24	
26	943	942	941	939	938	937	936	934	932	930	928	927	926	925	924	924	923	923	922	921	920	920	920	920	920	920	943	929	24
27	921	921	921	922	922	922	923	924	925	927	927	928	929	930	931	932	933	933	933	933	933	933	933	933	921	933	928	24	
28	933	932	932	932	932	931	931	930	929	929	929	929	928	928	927	927	926	926	926	925	926	926	926	926	925	933	929	24	
29	927	927	928	929	930	931	932	933	934	935	935	936	936	936	936	935	935	935	934	934	934	934	933	934	927	936	933	24	
30	934	934	934	934	934	934	934	935	935	935	935	936	935	935	934	934	933	932	932	932	932	933	933	933	932	936	934	24	
HOURLY MAX	959	959	958	958	957	957	956	956	957	957	957	957	958	958	958	959	959	959	960	960	960	960	960	960					
HOURLY AVG	940	940	940	940	940	940	940	940	940	940	940	940	939	939	939	939	939	940	940	940	940	940	940	940					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

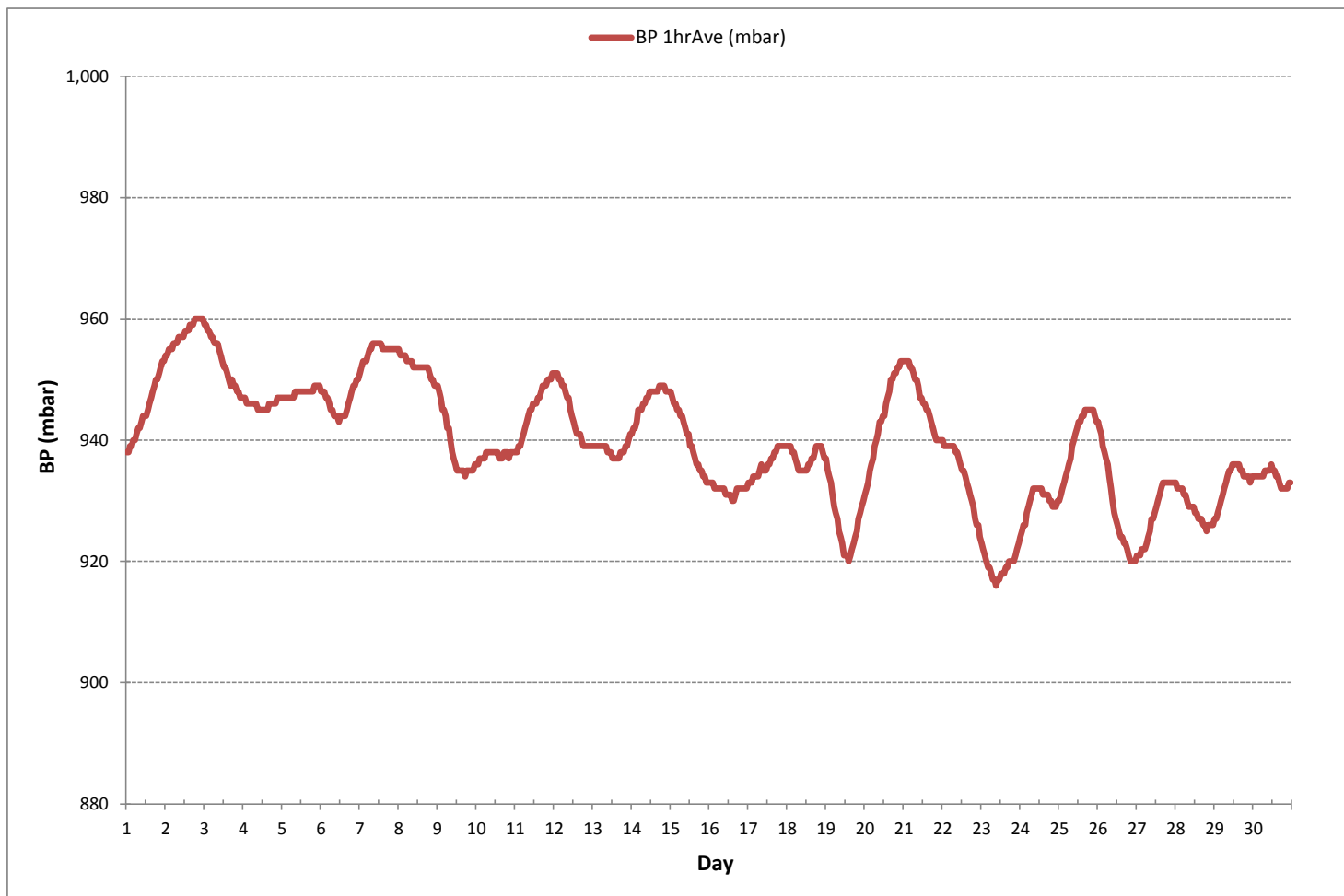
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	916	mbar	@ HOUR	9	ON DAY	23
MAXIMUM 1-HR AVERAGE:	960	mbar	@ HOUR	18	ON DAY	2
MAXIMUM 24-HR AVERAGE:	958	mbar			ON DAY	2
OPERATIONAL TIME:					720	hrs
AMD OPERATION UPTIME:					100.0	%
STANDARD DEVIATION:	10		MONTHLY AVERAGE:		940	mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



AMBIENT TEMPERATURE



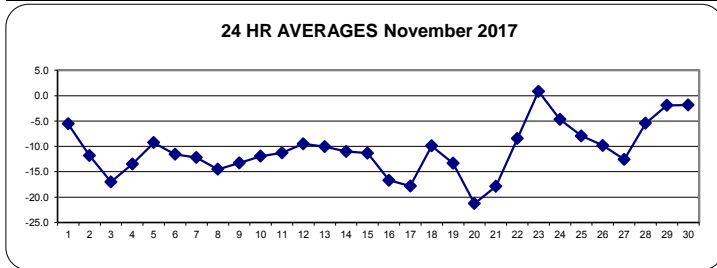
PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	-3.0	-3.2	-3.4	-3.9	-4.4	-4.9	-5.2	-5.2	-5.4	-4.7	-3.5	-3.3	-3.6	-4.7	-5.3	-5.7	-6.4	-6.9	-7.5	-7.9	-8.3	-9.0	-8.9	-8.8	-9.0	-3.0	-5.5	24
2	-8.8	-9.3	-9.8	-10.1	-10.4	-10.5	-10.6	-10.8	-10.9	-10.3	-9.5	-8.6	-9.5	-10.2	-10.1	-10.6	-11.4	-12.2	-12.6	-13.1	-15.8	-18.3	-19.8	-20.7	-20.7	-8.6	-11.8	24
3	-21.5	-22.3	-23.1	-23.6	-23.2	-22.8	-23.5	-24.0	-22.6	-17.8	-13.2	-11.8	-11.3	-11.3	-10.8	-10.8	-11.5	-13.4	-14.6	-15.1	-15.3	-15.3	-14.7	-14.8	-24.0	-10.8	-17.0	24
4	-14.8	-15.4	-15.8	-15.8	-15.6	-15.5	-15.9	-16.1	-16.5	-14.9	-13.6	-11.3	-11.4	-11.8	-11.8	-12.1	-12.3	-12.9	-12.8	-12.3	-12.0	-11.4	-10.8	-10.3	-16.5	-10.3	-13.5	24
5	-9.9	-9.5	-10.2	-9.9	-9.0	-9.7	-8.5	-7.7	-8.7	-7.7	-6.6	-5.1	-4.7	-5.0	-5.7	-5.9	-7.4	-8.8	-10.8	-15.0	-16.3	-17.1	-17.3	-17.3	-4.7	-9.3	24	
6	-15.6	-15.9	-15.6	-14.6	-14.5	-13.9	-12.2	-11.9	-12.0	-11.4	-11.0	-9.4	-8.6	-8.0	-7.3	-6.4	-6.8	-8.4	-9.8	-11.0	-12.6	-13.3	-13.3	-13.3	-15.9	-6.4	-11.5	24
7	-13.8	-13.7	-10.4	-9.0	-8.9	-9.0	-10.1	-11.2	-11.9	-11.3	-10.6	-10.2	-9.3	-9.9	-9.8	-10.8	-11.5	-12.4	-13.1	-14.5	-16.4	-18.3	-18.9	-17.4	-18.9	-8.9	-12.2	24
8	-15.9	-15.4	-14.9	-14.3	-13.9	-14.0	-14.2	-15.5	-16.9	-12.5	-13.0	-12.3	-11.4	-11.1	-10.8	-10.8	-12.5	-14.6	-16.0	-16.5	-16.3	-18.3	-19.0	-18.3	-19.0	-10.8	-14.5	24
9	-19.8	-19.4	-18.3	-17.2	-18.0	-16.3	-15.6	-15.9	-13.8	-11.1	-8.6	-5.5	-6.3	-9.5	-8.9	-10.3	-11.7	-12.3	-13.2	-13.1	-13.1	-13.4	-13.7	-13.9	-19.8	-5.5	-13.3	24
10	-13.4	-12.7	-12.1	-12.0	-11.7	-11.5	-13.2	-15.6	-13.8	-11.5	-10.1	-10.0	-10.5	-10.4	-8.8	-9.7	-10.9	-14.4	-13.4	-12.2	-11.2	-12.8	-12.8	-11.7	-15.6	-8.8	-11.9	24
11	-10.8	-12.1	-12.3	-13.5	-13.9	-14.1	-14.6	-16.6	-18.1	-17.2	-13.4	-9.9	-7.4	-4.9	-4.0	-7.1	-9.0	-10.1	-10.2	-9.6	-9.8	-10.0	-10.7	-11.0	-18.1	-4.0	-11.3	24
12	-11.2	-11.4	-11.7	-11.9	-11.8	-11.7	-11.5	-11.3	-11.2	-10.5	-9.9	-9.0	-7.8	-7.6	-7.5	-7.5	-7.3	-7.8	-8.1	-8.1	-7.9	-8.0	-8.6	-8.6	-11.9	-7.3	-9.5	24
13	-8.7	-8.9	-9.4	-9.6	-10.4	-10.9	-11.1	-11.1	-10.7	-10.3	-9.6	-9.3	-9.2	-9.1	-9.2	-9.4	-9.9	-10.5	-10.2	-10.4	-10.7	-10.7	-10.8	-10.9	-11.1	-8.7	-10.0	24
14	-10.9	-10.8	-11.2	-11.9	-12.2	-11.9	-12.1	-12.3	-12.6	-11.6	-10.9	-10.2	-10.1	-9.6	-9.8	-10.2	-10.4	-10.6	-10.8	-10.8	-10.6	-10.6	-10.7	-10.9	-12.6	-9.6	-11.0	24
15	-11.1	-11.1	-11.3	-11.3	-11.4	-11.6	-11.7	-11.7	-11.8	-11.8	-11.4	-11.4	-10.8	-10.2	-10.2	-10.4	-10.7	-10.9	-11.1	-11.3	-11.4	-12.4	-12.4	-13.7	-13.7	-10.2	-11.3	24
16	-13.9	-14.4	-15.0	-15.3	-15.6	-15.7	-15.9	-17.6	-18.4	-18.5	-17.2	-17.3	-16.6	-16.3	-16.0	-16.2	-18.3	-19.4	-18.6	-17.4	-17.0	-16.9	-16.7	-16.5	-19.4	-13.9	-16.7	24
17	-16.6	-16.9	-18.2	-19.6	-20.4	-21.3	-20.8	-22.7	-24.6	-22.2	-16.3	-16.6	-15.3	-14.9	-15.3	-15.7	-16.8	-17.2	-16.4	-15.9	-15.2	-15.0	-17.0	-17.0	-24.6	-14.9	-17.8	24
18	-15.3	-15.1	-15.2	-14.1	-12.3	-10.8	-8.8	-7.2	-6.1	-6.9	-7.8	-4.7	-5.1	-6.1	-6.3	-6.1	-8.2	-9.6	-10.9	-11.2	-11.7	-12.2	-12.8	-13.0	-15.3	-4.7	-9.9	24
19	-12.4	-11.6	-11.9	-11.9	-12.3	-12.5	-11.9	-12.1	-11.9	-11.4	-11.1	-10.7	-9.9	-10.7	-11.4	-12.9	-13.8	-14.6	-15.4	-15.8	-17.1	-17.8	-18.9	-19.9	-19.9	-9.9	-13.3	24
20	-20.4	-20.6	-21.3	-22.4	-23.1	-22.9	-22.5	-22.1	-22.3	-23.1	-22.8	-21.1	-20.6	-20.4	-20.2	-19.8	-19.5	-19.6	-20.1	-20.8	-22.7	-21.8	-20.5	-19.8	-23.1	-19.5	-21.3	24
21	-19.6	-19.5	-21.2	-22.6	-23.0	-21.3	-20.3	-19.7	-19.6	-18.7	-16.1	-15.5	-14.8	-15.0	-15.7	-16.3	-16.4	-16.4	-16.2	-16.1	-16.0	-16.2	-16.2	-16.1	-23.0	-14.8	-17.9	24
22	-15.8	-15.8	-15.0	-14.4	-13.9	-13.8	-13.1	-12.5	-12.0	-11.2	-9.8	-8.2	-6.8	-5.6	-4.6	-4.0	-3.6	-3.5	-4.3	-4.3	-3.2	-2.6	-2.6	-2.2	-15.8	-2.2	-8.5	24
23	-2.2	-2.1	-1.5	0.3	1.3	1.7	2.2	1.9	2.4	3.0	3.5	3.5	2.7	2.7	2.7	2.3	2.0	1.8	0.0	-0.3	-0.6	-0.5	-2.3	-4.3	-4.3	3.5	0.8	24
24	-5.1	-6.2	-6.8	-6.5	-7.5	-7.8	-8.5	-10.9	-12.7	-11.8	-6.6	-3.9	-4.2	-3.3	-2.7	-3.4	-3.5	-2.7	-2.0	-0.9	-0.4	0.8	1.6	2.1	-12.7	2.1	-4.7	24
25	2.5	2.3	1.8	0.9	-0.3	-2.8	-4.6	-6.1	-7.5	-9.0	-9.7	-9.7	-9.7	-9.9	-10.4	-11.3	-12.3	-13.0	-13.6	-14.0	-13.4	-13.6	-13.4	-13.6	-14.0	2.5	-7.9	24
26	-13.0	-12.1	-11.2	-11.1	-10.9	-10.9	-10.8	-10.5	-10.1	-9.7	-9.7	-9.4	-8.8	-8.4	-8.6	-8.8	-8.8	-8.9	-8.8	-8.6	-8.4	-8.3	-8.9	-13.0	-8.3	-9.8	24	
27	-8.9	-9.5	-10.0	-10.7	-11.6	-11.7	-12.4	-14.3	-14.0	-12.4	-11.5	-11.0	-10.7	-10.6	-11.4	-12.1	-13.5	-14.7	-15.6	-16.0	-15.0	-14.4	-15.1	-16.0	-8.9	-12.6	24	
28	-13.6	-12.2	-10.7	-10.3	-8.9	-7.7	-8.2	-7.9	-5.9	-5.3	-5.2	-3.4	-2.3	-1.2	-1.3	-2.1	-3.0	-3.4	-3.6	-3.1	-4.8	-4.6	-0.8	-1.2	-13.6	-0.8	-5.4	24
29	-0.6	-1.3	-2.5	-4.0	-4.7	-6.0	-5.9	-5.9	-6.8	-6.6	-5.8	-3.8	-1.3	-1.0	0.0	0.6	0.2	0.7	1.7	2.4	1.4	1.5	1.2	0.6	-6.8	2.4	-1.9	24
30	-0.1	-0.3	-1.4	-1.6	-1.3	-1.5	-2.0	-1.9	-2.7	-2.5	-2.0	-1.3	-0.3	-0.1	-0.5	-1.4	-2.0	-1.6	-2.8	-6.1	-3.8	-2.0	-1.9	-3.2	-6.1	-0.1	-1.8	24
HOURLY MAX	2.5	2.3	1.8	0.9	1.3	1.7	2.2	1.9	2.4	3.0	3.5	3.5	2.7	2.7	2.7	2.3	2.0	1.8	1.7	2.4	1.4	1.5	1.6	2.1				
HOURLY AVG	-11.5	-11.5	-11.7	-11.7	-11.8	-11.8	-11.8	-12.2	-12.3	-11.4	-10.1	-9.0	-8.5	-8.5	-8.4	-8.8	-9.5	-10.2	-10.6	-10.8	-11.1	-11.4	-11.5	-11.7				

STATUS FLAG CODES

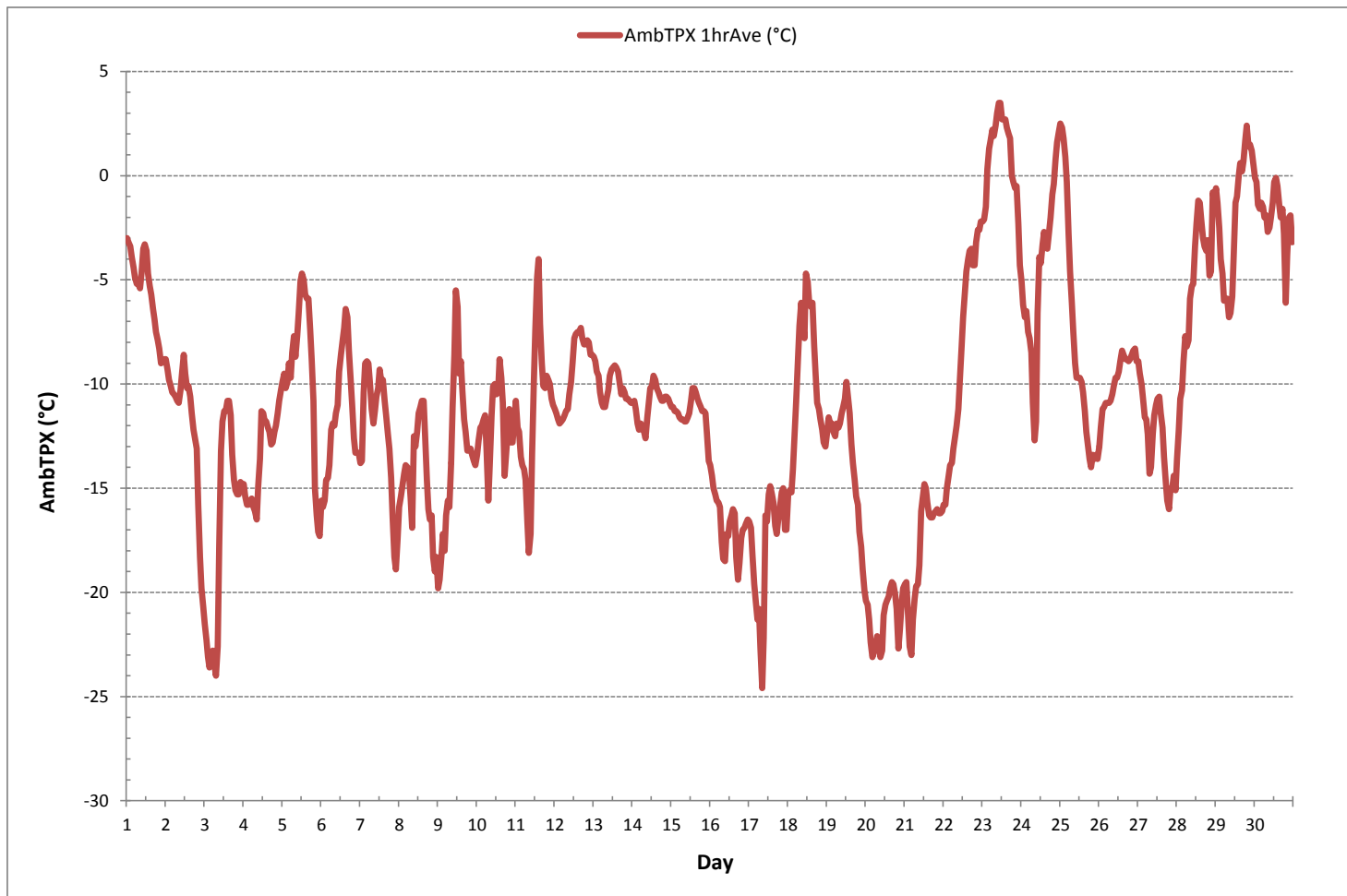
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-24.6 °C	@ HOUR	8	ON DAY	17
MAXIMUM 1-HR AVERAGE:	3.5 °C	@ HOUR	10	ON DAY	23
MAXIMUM 24-HR AVERAGE:	0.8 °C			ON DAY	23
OPERATIONAL TIME:		720 hrs			
AMD OPERATION UPTIME:		100.0 %			
STANDARD DEVIATION:	5.7	MONTHLY AVERAGE:	-10.7 °C		

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



STATION TEMPERATURE



PEACE RIVER AREA MONITORING PROGRAM COMMITTEE
Three Creeks 842b Station - November 2017

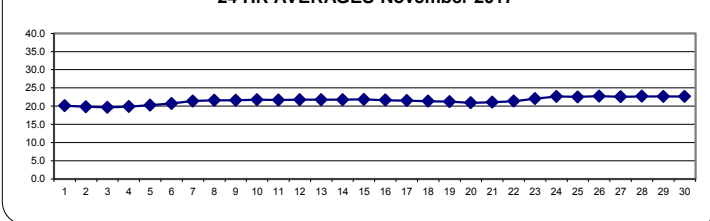
STATION TEMPERATURE Hourly Averages (StnTPX °C)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	19.9	20.3	20.3	20.2	20.2	20.2	20.2	20.1	20.1	19.9	20.3	20.2	20.0	20.3	20.1	19.8	20.2	19.9	20.2	20.0	20.0	19.7	19.9	20.0	19.7	20.3	20.1	24	
2	19.9	20.0	19.9	19.7	19.7	19.9	19.8	19.8	19.7	19.7	19.8	20.0	19.7	19.8	19.9	19.8	19.8	19.7	19.9	19.9	19.9	19.7	19.7	19.5	19.5	20.0	19.8	24	
3	19.5	19.4	19.3	19.5	19.6	19.5	19.2	19.2	19.2	19.5	19.4	19.6	19.8	19.9	20.2	19.9	20.3	20.0	20.1	19.9	19.8	19.7	19.8	19.8	19.2	20.3	19.7	24	
4	19.8	19.9	20.0	19.8	19.7	19.7	19.7	19.6	19.6	19.7	19.7	20.0	19.9	20.0	19.9	19.8	20.2	19.9	20.1	20.0	19.9	20.1	20.0	19.8	19.6	20.2	19.9	24	
5	20.2	19.9	20.4	19.9	20.3	20.0	20.3	19.9	20.0	20.1	20.0	20.0	20.1	20.2	20.2	20.2	20.4	20.6	20.6	20.6	20.6	20.5	20.8	20.4	20.6	19.9	20.8	20.3	24
6	20.6	20.5	20.3	20.7	20.6	20.5	20.8	20.8	20.7	20.6	20.8	20.8	20.7	20.8	20.8	21.0	20.6	20.8	20.8	21.0	20.5	20.7	21.0	20.9	20.3	21.0	20.7	24	
7	20.8	21.0	20.9	21.0	20.9	20.8	20.9	20.7	20.9	21.3	21.4	21.7	22.5	22.6	22.3	22.1	21.4	21.1	21.7	21.3	21.5	21.7	21.3	21.5	20.7	22.6	21.4	24	
8	21.5	21.4	21.8	21.5	21.6	21.8	21.8	21.4	21.5	21.6	21.4	21.7	21.8	21.6	21.5	21.9	21.9	21.6	21.6	21.9	21.4	21.6	21.6	21.3	21.3	21.9	21.6	24	
9	21.6	21.2	21.7	21.3	21.5	21.4	21.5	21.4	21.8	21.5	21.8	21.9	21.4	21.8	21.8	21.7	21.9	21.8	21.9	21.5	21.9	21.4	21.8	21.5	21.2	21.9	21.6	24	
10	21.6	21.9	21.9	21.7	21.6	21.5	21.6	21.8	21.5	21.5	21.7	21.8	21.7	21.9	21.9	21.6	22.0	21.9	21.7	21.7	21.8	21.7	21.7	22.0	21.5	22.0	21.7	24	
11	21.8	21.8	21.7	21.6	21.9	21.6	21.5	21.8	21.5	21.6	21.7	21.7	21.8	21.7	21.5	22.0	21.6	21.6	21.9	21.8	21.8	21.8	21.7	21.7	21.5	22.0	21.7	24	
12	21.7	21.6	21.7	21.8	21.8	21.8	21.8	21.8	21.8	21.7	22.1	21.8	21.7	22.0	21.6	22.0	21.7	21.6	21.7	21.6	21.7	22.1	21.8	21.6	21.6	21.6	22.1	21.8	24
13	21.6	22.1	21.5	22.0	21.6	22.0	21.7	22.1	21.5	22.1	21.5	22.1	21.5	22.1	21.7	21.6	21.7	21.8	21.5	21.9	21.8	21.6	21.9	21.7	21.5	22.1	21.8	24	
14	21.5	22.0	21.8	21.7	22.0	21.7	21.4	21.9	21.9	21.8	21.5	22.1	21.7	21.6	22.0	21.8	21.6	22.0	21.6	21.9	21.7	21.8	21.8	21.9	21.4	22.1	21.8	24	
15	21.8	21.9	21.7	22.1	21.7	22.1	21.5	22.2	21.9	21.7	22.0	21.6	22.1	21.6	21.9	21.9	21.6	22.1	21.5	22.2	21.6	22.0	21.6	21.6	21.5	22.2	21.8	24	
16	21.8	21.9	21.7	21.7	21.5	21.7	21.6	21.5	21.8	21.8	21.6	21.6	21.5	21.5	21.5	21.6	21.8	21.8	21.6	21.5	21.4	21.8	21.6	21.6	21.4	21.9	21.6	24	
17	21.5	21.5	21.5	21.8	21.7	21.5	21.5	21.4	21.8	21.4	21.4	21.6	21.5	21.5	21.8	21.8	21.8	21.7	22.2	21.8	21.2	21.1	21.0	21.0	21.0	22.2	21.5	24	
18	21.1	21.0	21.1	21.2	21.3	21.4	21.6	21.6	21.6	21.4	21.6	21.6	21.4	21.6	21.3	21.6	21.4	21.3	21.2	21.5	21.1	21.3	21.4	21.0	21.0	21.6	21.4	24	
19	21.3	21.3	21.1	21.5	21.3	21.2	21.6	21.3	21.5	21.2	21.6	21.3	21.3	21.6	21.1	21.4	21.2	21.2	21.0	20.9	21.1	21.0	20.9	20.9	20.9	21.6	21.2	24	
20	21.0	20.9	21.0	20.9	20.9	20.7	21.0	20.9	20.9	21.0	20.8	21.1	20.9	20.8	21.1	20.8	20.9	21.0	20.8	20.9	21.1	20.9	20.8	21.1	20.7	21.1	20.9	24	
21	21.0	20.9	20.9	21.1	20.8	20.8	21.1	21.1	20.9	20.9	21.0	21.1	21.2	21.3	21.2	21.2	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.3	20.8	21.3	21.1	24	
22	21.1	21.1	21.2	21.2	21.2	21.1	21.2	21.5	21.4	21.2	21.6	21.4	21.7	21.3	21.7	21.4	21.4	21.5	21.7	21.4	21.4	21.4	21.4	21.5	21.5	21.1	21.7	21.4	24
23	21.5	21.6	21.5	21.6	21.3	21.4	21.0	21.3	21.1	21.1	22.0	22.2	22.6	23.2	22.9	22.8	22.9	22.5	22.4	22.6	22.5	22.6	22.6	22.7	21.0	23.2	22.1	24	
24	22.7	22.6	22.7	22.7	22.5	22.7	22.6	22.6	22.5	22.4	22.8	22.5	22.6	22.7	22.5	22.7	22.8	22.7	22.6	22.8	22.8	22.5	22.7	22.7	22.4	22.8	22.6	24	
25	22.9	22.6	22.6	22.8	22.6	22.6	22.6	22.4	22.7	22.4	22.5	22.5	22.4	22.6	22.4	22.6	22.3	22.4	22.4	22.4	22.5	22.6	22.5	22.5	22.3	22.9	22.5	24	
26	22.6	22.6	22.5	22.6	22.7	22.5	22.8	22.8	22.7	22.9	23.0	22.8	22.9	23.0	22.6	23.1	22.6	23.0	22.7	22.7	22.7	22.7	22.7	22.7	22.5	23.1	22.7	24	
27	22.7	22.8	22.6	22.8	22.6	22.6	22.5	22.6	22.7	22.5	22.4	22.5	22.6	22.6	22.4	22.6	22.4	22.7	22.7	22.6	22.6	22.6	22.7	22.7	22.4	22.8	22.6	24	
28	22.6	22.5	22.6	22.7	22.7	22.6	22.7	22.6	22.8	22.8	22.6	22.7	22.6	22.8	22.8	22.8	22.8	22.8	22.6	22.7	22.8	22.7	22.7	22.6	22.7	22.5	22.8	22.7	24
29	22.7	22.6	22.8	22.6	22.7	22.7	22.7	22.7	22.8	22.7	22.7	22.7	22.6	22.8	22.6	22.7	22.7	22.6	22.6	22.6	22.5	22.6	22.6	22.6	22.5	22.8	22.8	22.7	24
30	22.7	22.6	22.7	22.6	22.6	22.7	22.7	22.6	22.8	22.5	22.7	22.4	22.3	22.5	22.8	22.5	22.8	22.6	22.6	22.6	22.6	22.6	22.6	22.5	22.8	22.3	22.8	22.6	24
HOURLY MAX	22.9	22.8	22.8	22.8	22.7	22.7	22.8	22.8	22.8	22.9	23.0	22.8	22.9	23.2	22.9	23.1	22.9	23.0	22.8	22.8	22.8	22.8	22.7	22.7	22.8				
HOURLY AVG	21.4	21.4	21.4	21.5	21.4	21.4	21.4	21.4	21.5	21.4	21.5	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.5	21.5	21.5	21.5					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

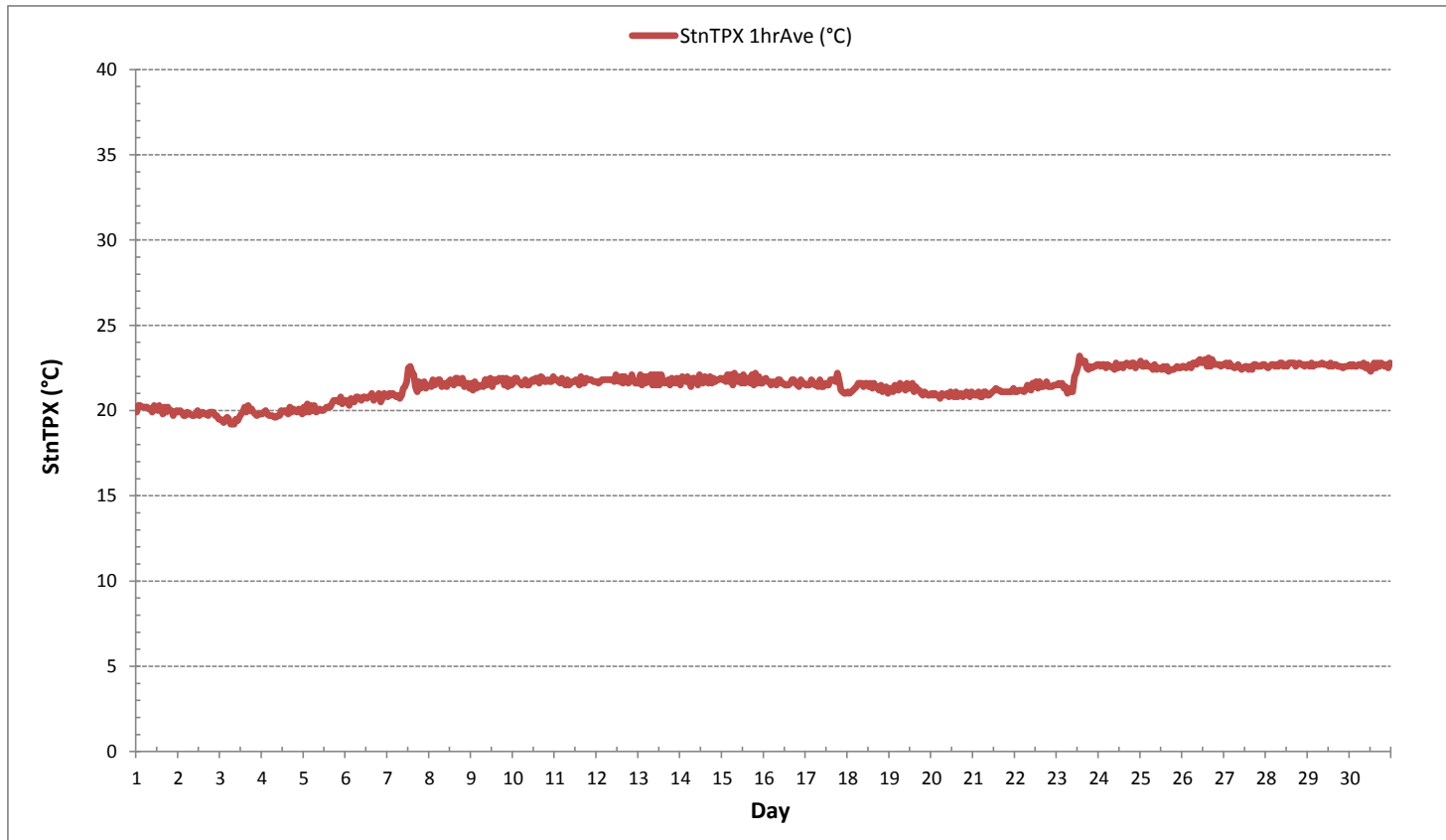
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	19.2 °C	@ HOUR	6	ON DAY	3
MAXIMUM 1-HR AVERAGE:	23.2 °C	@ HOUR	13	ON DAY	23
MAXIMUM 24-HR AVERAGE:	22.7 °C			ON DAY	26
OPERATIONAL TIME:					720 hrs
AMD OPERATION UPTIME:					100.0 %
STANDARD DEVIATION:	0.9	MONTHLY AVERAGE:			21.5 °C

STATION TEMPERATURE Hourly Averages (StnTPX °C)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



API 100A Sulphur Dioxide Analyzer Calibration

Date:	November 7, 2017	Barometer/B.P./units:	Brunton 05535 expires December 5, 2017	954	millibars
Company/Airshed:	PRAMP	Thermometer/Station Temp:	F.S. 160459244 expires May 18, 2018	22	°C
Location/Station Name:	842b	Weather Conditions:	Cloudy/Overcast		
Parameter:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	13:48	Performed By/Reviewer:	Chris Wesson	Tom Bourque	
End Time 24 hr. (mst):	17:02	Cal Gas Expiry Date:	December 8, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

Analyzer:	ID# or Serial Number: 838	Range ppb: 500
Last Calibration Date:	October 18, 2017	As Found C.F.: 0.961
Previous C.F.:	1.000	New C.F.: 1.000

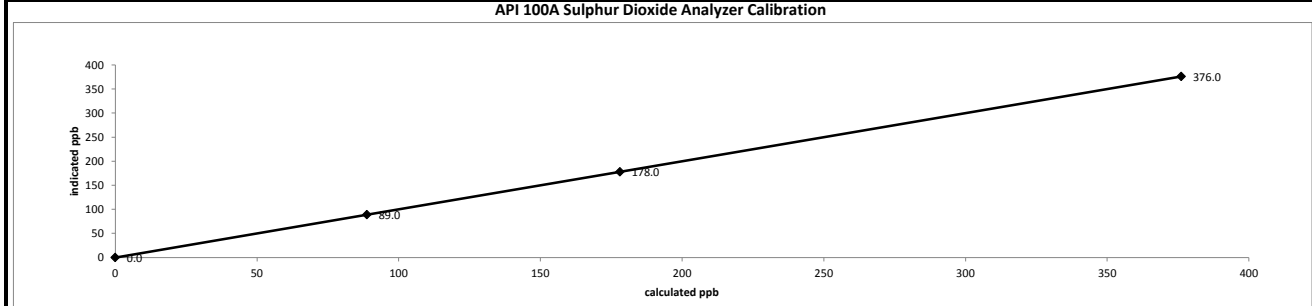
Calibration Standards: Low Flow Meter ID/Expiry Date: Defender 530+ Low #156151, Expiry 02-Oct-2018 High Flow Meter ID/Expiry Date: Defender 530+ High #156312, Expiry 02-Oct-2018 Calibrator ID/Expiry Date: Sabio id# 17100415 expires May 16, 2018 Cal Gas Cylinder I.D. #: EY000597 Cal Gas Conc. (ppm): 50.4	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>380</td></tr> <tr><td>Mid</td><td>180</td></tr> <tr><td>Low</td><td>90</td></tr> </table>	Point	ppb	High	380	Mid	180	Low	90
Point	ppb								
High	380								
Mid	180								
Low	90								

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	6021	0.00	6021	0.0	-0.2	n/a
as found high	5984	44.99	6029	376.1	391.0	0.961
adjusted zero	6021	0.00	6021	0.0	0.0	n/a
adjusted high	5984	44.99	6029	376.1	376.0	1.000
mid	5998	21.27	6019	178.1	178.0	1.000
low	6008	10.61	6019	88.8	89.0	0.998
calibrator zero	6021	0.00	6021	0.0	0.0	n/a
Average C.F.=						1.000

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS
		> or = 0.995
Slope =	1.001	0.95-1.05
b (Intercept as % of full scale)=	-0.02%	± 3% F.S.
% change in C.F. from last cal=	3.85%	± 10%



October 18, 2017 As Left 1.030 20.2 685 2544 51.2 29.8 7.3 60.1 26.3 634 54.4 2016.4 80.9 238.7	As found: Slope: 1.030 Offset: 20.2 Hvps: 686 Dcps: 2545 Rcell Temp: 49.5 Box Temp: 30.0 Pmt Temp: 7.5 Izs Temp: 60.0 Pres: 27.0 Samp Fl: 650 Pmt: 51.9 Uv Lamp: 1955 Lamp Ratio: 78.4 Str Lgt: 9.9 Drk Pmt: 30.7 Drk Lmp: 7.2 Expected Value: 238.7	As left: Slope: 0.986 Offset: 20.0 Hvps: 685 Dcps: 2544 Rcell Temp: 50.6 Box Temp: 29.5 Pmt Temp: 7.5 Izs Temp: 60.2 Pres: 27.0 Samp Fl: 651 Pmt: 52.5 Uv Lamp: 1951 Lamp Ratio: 78.5 Str Lgt: 9.9 Drk Pmt: 30.7 Drk Lmp: -7.2 Expected Value: 221.0
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Comments:
 The analyzer sample inlet filter was changed. The manifold blower was found to be working normally.

Flow measurements after mid-point

SO2[ppb] Station: PRAMP_842 Daily: 17/11/07 Type: AVG 1 Min. [1 Min.]



— SO2[ppb]



API 100A Sulphur Dioxide Analyzer Calibration

Date:	November 23, 2017	Barometer/B.P./units:	Brunton 05490 expires December 5, 2017	27.03	inHg
Company/Airshed:	PRAMP	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	21	°C
Location/Station Name:	842B	Weather Conditions:	Cloudy/Overcast		
Parameter:	Sulphur Dioxide	Calibration Purpose:	shut down		
Start Time 24 hr. (mst):	10:00	Performed By/Reviewer:	Limin Li	Rob Fisher	
End Time 24 hr. (mst):	12:18	Cal Gas Expiry Date:	December 8, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

Analyzer:	ID# or Serial Number: 838	Range ppb: 500
Last Calibration Date:	November 7, 2017	As Found C.F.: 0.994
Previous C.F.:	1.000	New C.F.: n/a

Calibration Standards: Low Flow Meter ID/Expiry Date: DC Lite Low 4425 expires February 3, 2018 High Flow Meter ID/Expiry Date: DC Lite High 108646 expires February 3, 2018 Calibrator ID/Expiry Date: Sabio id# 17200415 expires May 16, 2018 Cal Gas Cylinder I.D. #: EY0000769 Cal Gas Conc. (ppm): 50.5	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>380</td></tr> <tr><td>Mid</td><td>180</td></tr> <tr><td>Low</td><td>90</td></tr> </table>	Point	ppb	High	380	Mid	180	Low	90
Point	ppb								
High	380								
Mid	180								
Low	90								

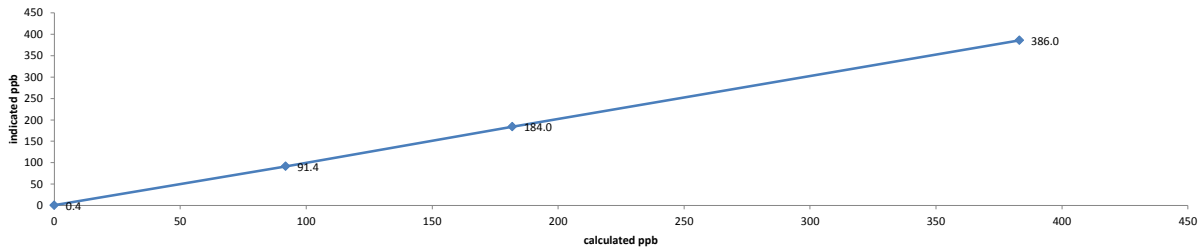
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	5744	0.00	5744	0.0	0.4	n/a
as found high	5703	43.60	5747	383.1	386.0	0.994
mid	5797	20.95	5818	181.8	184.0	0.991
low	5806	10.58	5817	91.8	91.4	1.010
Average C.F. =						0.998

Linear Regression/Calibration Results:

LIMITS
Correlation Coefficient = <u>1.000</u> > or = 0.995
Slope = <u>0.992</u> 0.90-1.10
b (Intercept as % of full scale) = <u>0.01%</u> ± 3% F.S.
% change in C.F. from last cal = <u>0.63%</u> ± 10%

API 100A Sulphur Dioxide Analyzer Calibration



As found: Slope: <u>0.986</u> Offset: <u>20.0 MV</u> Hvps: <u>686 VOLTS</u> Dcps: <u>2544 MV</u> Rcell Temp: <u>51.2 °C</u> Box Temp: <u>30.6 °C</u> Pmt Temp: <u>7.8 °C</u> Izs Temp: <u>60.1 °C</u> Pres: <u>26.0 IN-HG-A</u> Samp Fl: <u>625 CC/M</u> Pmt: <u>50.0 MV</u> Uv Lamp: <u>1995 MV</u> Lamp Ratio: <u>80.3</u> Str Lgt: <u>9.9 PPB</u> Drk Pmt: <u>28.8 MV</u> Drk Lmp: <u>-7.3 MV</u> Expected Value: <u>221.0</u>	As left: Slope: <u>n/a</u> Offset: <u>n/a</u> Hvps: <u>n/a</u> Dcps: <u>n/a</u> Rcell Temp: <u>n/a</u> Box Temp: <u>n/a</u> Pmt Temp: <u>n/a</u> Izs Temp: <u>n/a</u> Pres: <u>n/a</u> Samp Fl: <u>n/a</u> Pmt: <u>n/a</u> Uv Lamp: <u>n/a</u> Lamp Ratio: <u>n/a</u> Str Lgt: <u>n/a</u> Drk Pmt: <u>n/a</u> Drk Lmp: <u>n/a</u> Expected Value: <u>n/a</u>
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Comments:

The manifold blower was found to be working normally.

Analyzer 838 indicated a PMT TEMP alarm occurred during the (as found) high point verification. The "as found" point was recorded. A shutdown calibration was performed to investigate the PMT Alarm event. The Daily Zero/Span started at 11:00 am.

Flow measurements after mid-point



API 100A Sulphur Dioxide Analyzer Calibration

Date: <u>November 23, 2017</u>	Barometer/B.P./units: <u>Brunton 05490 expires December 5, 2017</u>	<u>27.06</u>	<u>inHg</u>
Company/Airshed: <u>PRAMP</u>	Thermometer/Station Temp: <u>F.S. 160348895 expires April 8, 2018</u>	<u>22</u>	<u>°C</u>
Location/Station Name: <u>842B</u>	Weather Conditions: <u>Cloudy/Overcast</u>		
Parameter: <u>Sulphur Dioxide</u>	Calibration Purpose: <u>post repair</u>		
Start Time 24 hr. (mst): <u>14:40</u>	Performed By/Reviewer: <u>Limin Li</u>	<u>Rob Fisher</u>	
End Time 24 hr. (mst): <u>18:50</u>	Cal Gas Expiry Date: <u>December 8, 2019</u>		
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>n/a</u>		

Analyzer ID# or Serial Number: <u>838</u>	Range ppb: <u>500</u>
Last Calibration Date: <u>November 7, 2017</u>	As Found C.F.: <u>n/a</u>
Previous C.F.: <u>n/a</u>	New C.F.: <u>0.999</u>

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>DC Lite Low 4425 expires February 3, 2018</u> High Flow Meter ID/Expiry Date: <u>DC Lite High 108646 expires February 3, 2018</u> Calibrator ID/Expiry Date: <u>Sabio id# 17200415 expires May 16, 2018</u> Cal Gas Cylinder I.D. #: <u>EY0000769</u> Cal Gas Conc. (ppm): <u>50.5</u>	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>380</td></tr> <tr><td>Mid</td><td>180</td></tr> <tr><td>Low</td><td>90</td></tr> </table>	Point	ppb	High	380	Mid	180	Low	90
Point	ppb								
High	380								
Mid	180								
Low	90								

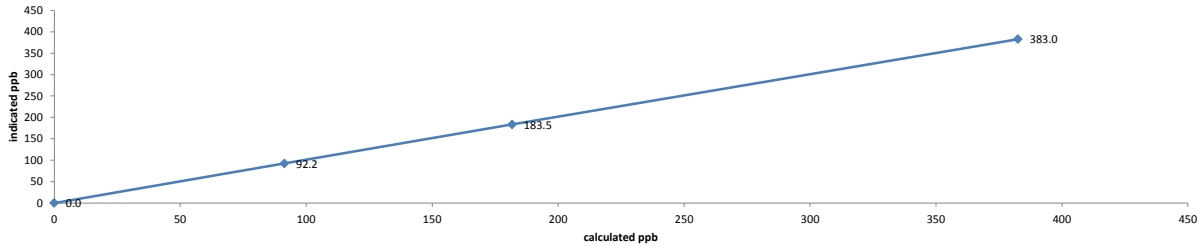
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
adjusted zero	5827	0.00	5827	0.0	0.0	n/a
adjusted high	5784	44.15	5828	382.6	383.0	0.999
mid	5793	20.93	5814	181.8	183.5	0.991
low	5803	10.52	5814	91.4	92.2	0.991
calibrator zero	5827	0.00	5827	0.0	0.4	n/a
Average C.F. =						0.994

Linear Regression/Calibration Results:

Correlation Coefficient =	<u>1.000</u>	LIMITS	> or = 0.995
Slope =	<u>0.999</u>	0.95-1.05	
b (Intercept as % of full scale) =	<u>-0.12%</u>	± 3% F.S.	
% change in C.F. from last cal =	<u>n/a</u>	n/a	

API 100A Sulphur Dioxide Analyzer Calibration



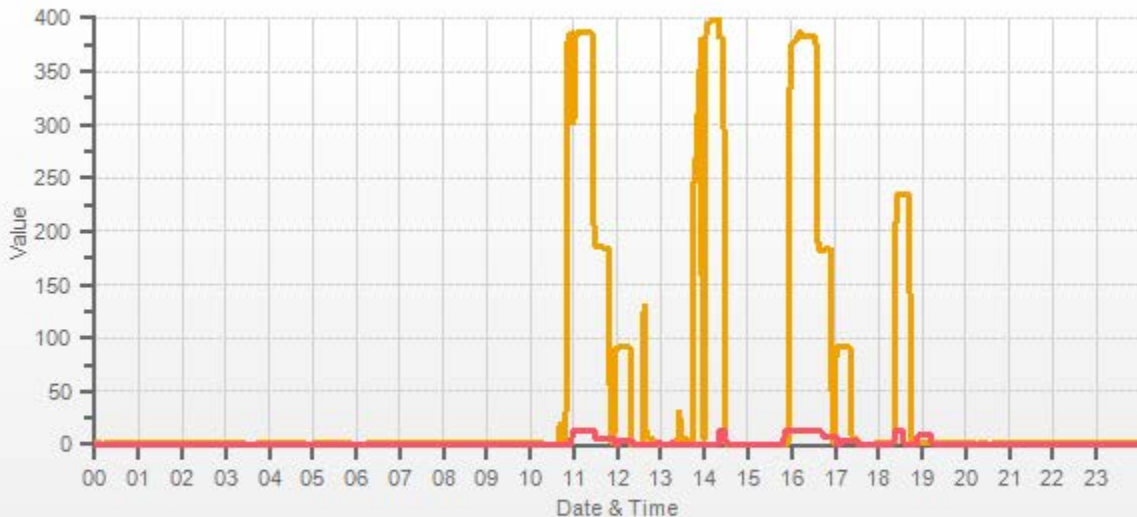
As found: Slope: <u>0.986</u> Offset: <u>20.0 MV</u> Hvps: <u>686 VOLTS</u> Dcps: <u>2544 MV</u> Rcell Temp: <u>51.2 °C</u> Box Temp: <u>30.6 °C</u> Pmt Temp: <u>7.8 °C</u> Izs Temp: <u>60.1 °C</u> Pres: <u>26.0 IN-HG-A</u> Samp Fl: <u>625 CC/M</u> Pmt: <u>50.0 MV</u> Uv Lamp: <u>1995 MV</u> Lamp Ratio: <u>80.3 %</u> Str Lgt: <u>9.9 PPB</u> Drk Pmt: <u>28.8 MV</u> Drk Lmp: <u>-7.3 MV</u> Expected Value: <u>221.0</u>	As left: Slope: <u>0.972</u> Offset: <u>19.4</u> Hvps: <u>710 VOLTS</u> Dcps: <u>2544 MV</u> Rcell Temp: <u>50.2 °C</u> Box Temp: <u>29.5 °C</u> Pmt Temp: <u>7.7 °C</u> Izs Temp: <u>60.1 °C</u> Pres: <u>26.0 IN-HG-A</u> Samp Fl: <u>623 CC/M</u> Pmt: <u>50.0 MV</u> Uv Lamp: <u>2010 MV</u> Lamp Ratio: <u>102.9 %</u> Str Lgt: <u>9.4 PPB</u> Drk Pmt: <u>31.7 MV</u> Drk Lmp: <u>-7.3 MV</u> Expected Value: <u>233.9</u>
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Comments:

The manifold blower was found to be working normally.

Analyzer 838 indicated a PMT TEMP alarm during the (as found) high point verification requiring an inspection and a post repair calibration. The PMT fan was changed and the UV lamp was calibrated.

Flow measurements after mid-point



SO2[ppb] NMHC[ppm]

TOTAL REDUCED SULPHUR



Thermo 431-TLE Total Reduced Sulphur Analyzer Calibration

Date: <u>November 7, 2017</u>	Barometer/B.P./units: <u>Brunton 05535 expires December 5, 2017</u>	<u>955</u>	millibars
Company/Airshed: <u>PRAMP</u>	Thermometer/Station Temp: <u>F.S. 160459244 expires May 18, 2018</u>	<u>21</u>	°C
Location/Station Name: <u>842b</u>	Weather Conditions: <u>Cloudy/Overcast</u>		
Parameter: <u>Total Reduced Sulphur</u>	Calibration Purpose: <u>routine monthly</u>		
Start Time 24 hr. (mst): <u>10:53</u>	Performed By/Reviewer: <u>Chris Wesson</u>	<u>Tom Bourque</u>	
End Time 24 hr. (mst): <u>15:03</u>	Cal Gas Expiry Date: <u>May 16, 2020</u>		
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>CD Nova CDN-101 #553</u>		

Analyzer: ID# or Serial Number: <u>1162460023</u>	Range ppb: <u>100</u>
Last Calibration Date: <u>October 18, 2017</u>	As Found C.F.: <u>1.014</u>
Previous C.F.: <u>1.000</u>	New C.F.: <u>1.000</u>

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>Defender 530+ Low #156151, Expiry 02-Oct-2018</u> High Flow Meter ID/Expiry Date: <u>Defender 530+ High #156312, Expiry 02-Oct-2018</u> Calibrator ID/Expiry Date: <u>API id# 830 expires February 14, 2018</u> Cal Gas Cylinder I.D. #: <u>LL119420</u> Cal Gas Conc. (ppm): <u>10.2</u>	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <tr><td>Point</td><td>ppb</td></tr> <tr><td>High</td><td>78</td></tr> <tr><td>Mid</td><td>38</td></tr> <tr><td>Low</td><td>19</td></tr> </table>	Point	ppb	High	78	Mid	38	Low	19	SO2 Scrubber Check (10 minutes): Start/End Time 24 hr.: <u>11:36 / 11:51</u> SO2 Analyzer Range: <u>500</u> Target Concentration (ppb): <u>380</u> As Found Zero: <u>0.0</u> Analyzer Response: (ppb): <u>0.0</u> Zero Corrected Result (ppb): <u>0.0</u>
Point	ppb									
High	78									
Mid	38									
Low	19									

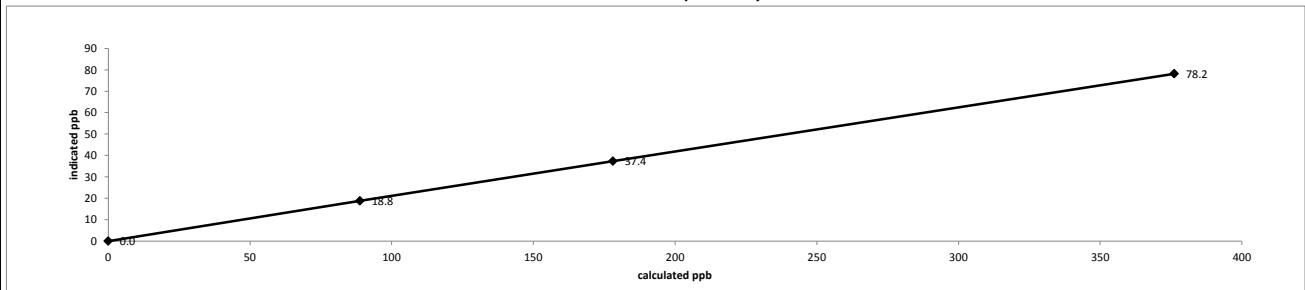
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
as found zero	7521	0.00	7521	0.0	0.1	n/a
as found high	7455	57.62	7513	78.2	77.3	1.014
adjusted zero	7521	0.00	7521	0.0	0.0	n/a
adjusted high	7455	57.62	7513	78.2	78.2	1.000
mid	7494	27.69	7522	37.5	37.4	1.004
low	7512	14.06	7526	19.0	18.8	1.013
calibrator zero	7521	0.00	7521	0.0	0.3	n/a
Average C.F. =						1.006

Linear Regression/Calibration Results:

LIMITS
Correlation Coefficient = <u>1.000</u> > or = 0.995
Slope = <u>0.999</u> 0.95-1.05
b (Intercept as % of full scale) = <u>0.12%</u> ± 3% F.S.
% change in C.F. from last cal = <u>-1.37%</u> ± 10%

Thermo 431-TLE Total Reduced Sulphur Analyzer Calibration



October 18, 2017 As Left

2.66	Bkg:	<u>2.61</u>
0.848	Coef:	<u>0.848</u>
-725.6	Pmt:	<u>-725.2</u>
976	Flash:	<u>985</u>
29.5	Internal:	<u>29.0</u>
44.9	Chamber:	<u>44.9</u>
45	Perm Oven Gas:	<u>45.00</u>
44.1	Perm Oven Heater:	<u>44.10</u>
653.4	Pressure:	<u>674.7</u>
0.402	Sample Flow:	<u>0.413</u>
88	Lamp Intensity:	<u>89</u>
850	Converter:	<u>850</u>
850	Converter Set:	<u>850</u>
120	Averaging Time:	<u>120</u>
59.7	Expected Value:	<u>59.7</u>

As found:

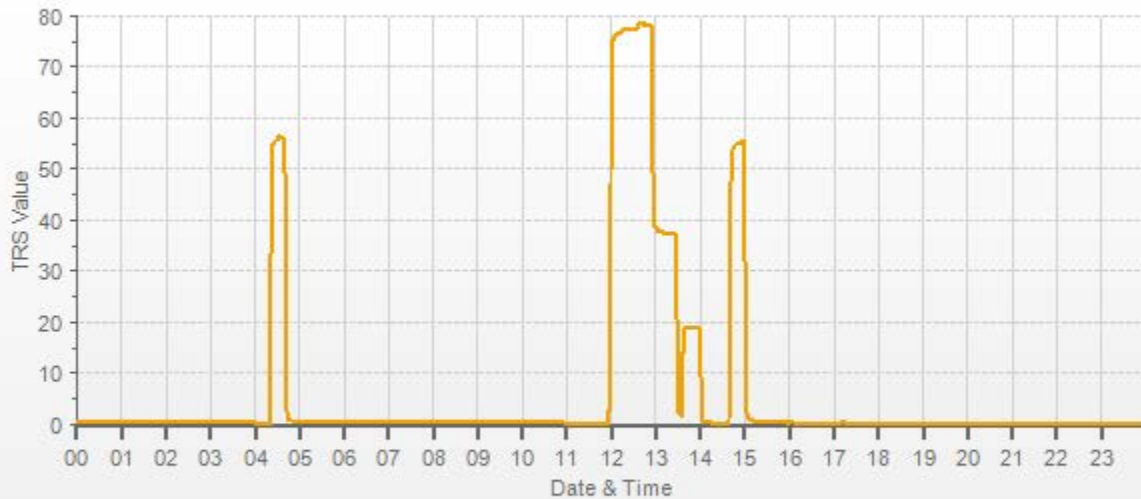
Bkg:	<u>2.76</u>
Coef:	<u>0.852</u>
Pmt:	<u>-725.2</u>
Flash:	<u>984</u>
Internal:	<u>30.3</u>
Chamber:	<u>44.9</u>
Perm Oven Gas:	<u>45.00</u>
Perm Oven Heater:	<u>44.11</u>
Pressure:	<u>674.1</u>
Sample Flow:	<u>0.414</u>
Lamp Intensity:	<u>98</u>
Converter:	<u>850</u>
Converter Set:	<u>850</u>
Averaging Time:	<u>120</u>
Expected Value:	<u>55.4</u>

Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.

Flow measurements after mid-point

TRS[ppb] Station: PRAMP_842 Daily: 17/11/07 Type: AVG 1 Min. [1 Min.]



— TRS[ppb]



Thermo 431-TLE Total Reduced Sulphur Analyzer Calibration

Date: <u>November 23, 2017</u>	Barometer/B.P./units: <u>Brunton 05490 expires December 5, 2017</u> <u>27.12</u> <u>inHg</u>	
Company/Airshed: <u>PRAMP</u>	Thermometer/Station Temp: <u>F.S. 160348895 expires April 8, 2018</u> <u>22</u> <u>°C</u>	
Location/Station Name: <u>842B</u>	Weather Conditions: <u>Cloudy/Overcast</u>	
Parameter: <u>Total Reduced Sulphur</u>	Calibration Purpose: <u>as found</u>	
Start Time 24 hr. (mst): <u>17:25</u>	Performed By/Reviewer: <u>Limin Li</u>	<u>Tom Bourque</u>
End Time 24 hr. (mst): <u>19:00</u>	Cal Gas Expiry Date: <u>January 6, 2018</u>	
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>n/a</u>	

Analyzer:	Range ppb: <u>100</u>
ID# or Serial Number: <u>838</u>	As Found C.F.: <u>1.023</u>
Last Calibration Date: <u>November 7, 2017</u>	New C.F.: <u>n/a</u>
Previous C.F.: <u>1.000</u>	

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>DC Lite Low 4425 expires February 3, 2018</u> High Flow Meter ID/Expiry Date: <u>DC Lite High 108646 expires February 3, 2018</u> Calibrator ID/Expiry Date: <u>Sabio id# 17200415 expires May 16, 2018</u> Cal Gas Cylinder I.D. #: <u>BLM002508</u> Cal Gas Conc. (ppm): <u>10.2</u>	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <tr><td>Point</td><td>ppb</td></tr> <tr><td>High</td><td>78</td></tr> <tr><td>Mid</td><td>38</td></tr> <tr><td>Low</td><td>19</td></tr> </table>	Point	ppb	High	78	Mid	38	Low	19
Point	ppb								
High	78								
Mid	38								
Low	19								

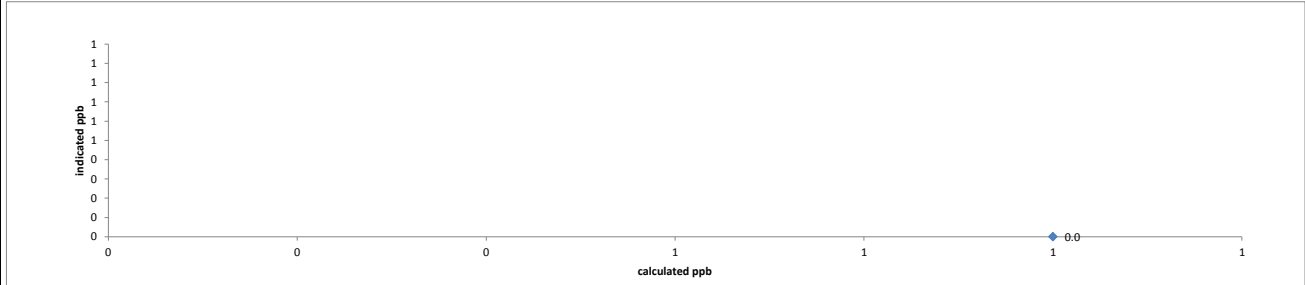
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	5827	0.00	5827	0.0	0.0	n/a
as found high	7232	56.21	7288	78.7	76.9	1.023
Average C.F. =						n/a

Linear Regression/Calibration Results:

	LIMITS
Correlation Coefficient =	#DIV/0! n/a
Slope =	#DIV/0! n/a
b (Intercept as % of full scale) =	#DIV/0! n/a
% change in C.F. from last cal =	-2.30% n/a

Thermo 431-TLE Total Reduced Sulphur Analyzer Calibration

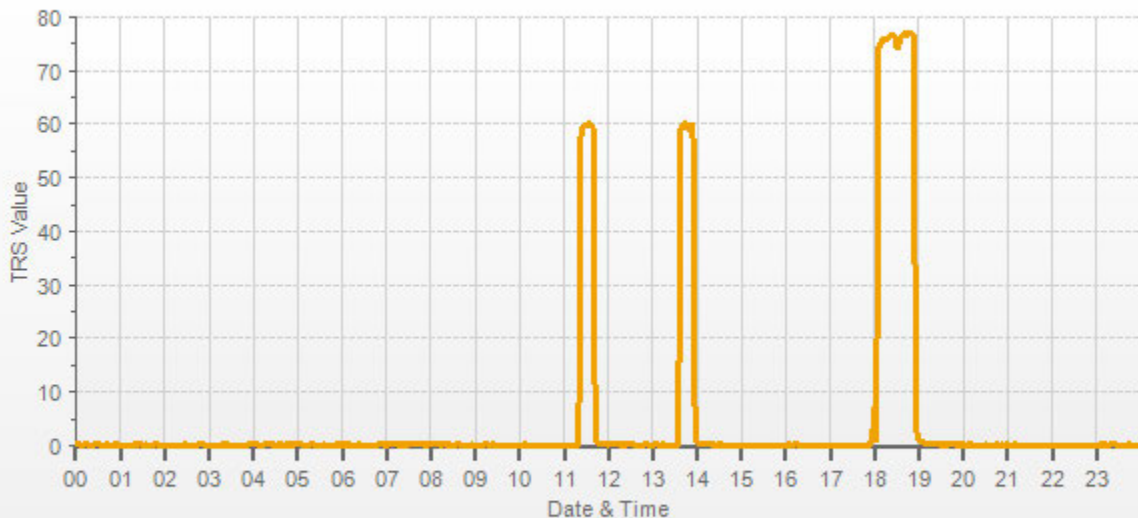


As found: Bkg: <u>2.83</u> Coef: <u>0.852</u> Pmt: <u>-725.6 VOLTS</u> Flash: <u>984 V</u> Internal: <u>30.0 °C</u> Chamber: <u>44.8 °C</u> Perm Oven Gas: <u>45.0 °C</u> Perm Oven Heater: <u>44.11 °C</u> Sample Flow: <u>645.9 mmHg</u> Lamp Intensity: <u>0.397 L/min</u> Converter: <u>850 °C</u> Converter Set: <u>850 °C</u> Averaging Time: <u>120 SEC</u> Expected Value: <u>55.4</u>	As left: Bkg: <u>2.83</u> Coef: <u>0.852</u> Pmt: <u>-725.6 VOLTS</u> Flash: <u>984 V</u> Internal: <u>30.0 °C</u> Chamber: <u>44.8 °C</u> Perm Oven Gas: <u>45.0 °C</u> Perm Oven Heater: <u>44.11 °C</u> Sample Flow: <u>645.9 mmHg</u> Lamp Intensity: <u>0.397 L/min</u> Converter: <u>850 °C</u> Converter Set: <u>850 °C</u> Averaging Time: <u>120 SEC</u> Expected Value: <u>55.4</u>
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Comments: The manifold blower was found to be working normally.

Daily span check was approximately 8%. An "as found" span verification was performed indicating a difference of 2.3%.

TRS[ppb] Station: PRAMP_842 Daily: 17/11/23 Type: AVG 1 Min. [1 Min.]



— TRS[ppb]

TOTAL HYDROCARBON



Thermo 55i Methane/Non-Methane Analyzer Calibration

Date:	November 7, 2017	Barometer/B.P./units:	Brunton 05535 expires December 5, 2017	955	millibars
Company/Airshed:	PRAMP	Thermometer/Station Temp:	F.S. 160459244 expires May 18, 2018	21	°C
Location/Station Name:	842b	Weather Conditions:	Cloudy/Overcast		
Parameter:	CH4 / NMHC / THC	Calibration Purpose:	routine monthly		
Start/End Time 24 hr. (mst):	10:53 / 14:24	Performed By/Reviewer:	Chris Wesson	Tom Bourque	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 25, 2023		

Analyzer:		Correction Factors:			
ID# or Serial Number:	1236656188	Previous C.F.:	As Found C.F.:	New C.F.:	
Measured Flow:	1.19 L/min	CH ₄ =	1.000	0.988	1.001
Last Calibration Date:	October 18, 2017	NMHC =	1.000	0.963	1.000
Range ppm:	20 CH4/20 NMHC/40 THC	THC =	1.000	0.975	1.001

Calibration Standards:

Low Flow Meter ID/Expiry Date:	Defender 530+ Low #156151, Expiry 02-Oct-2018	Standard Calibration Points for Analyzer Range of 20/20/40 ppm			
High Flow Meter ID/Expiry Date:	Defender 530+ High #156312, Expiry 02-Oct-2018	Point	CH4	NMHC	THC
Calibrator ID/Expiry Date:	Sabio id# 17100415 expires May 16, 2018	High	13.00	13.00	26.00
Cal Gas Cylinder I.D. #:	LL86139	Mid	7.00	7.00	14.00
CH4 Cylinder Conc. =	599.0 211.0 =C ₂ H ₆ Cylinder Conc.	Low	3.00	3.00	6.00
CH ₄ expressed as C ₂ H ₆ =	580.3 1179.3 =total CH4 equivalent				

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	Correction Factors:		
	Diluent	Cal Gas	Total Flow							CH ₄	NMHC	THC
as found zero	2494	0.00	2494	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2430	60.51	2491	14.55	14.10	28.65	14.73	14.64	29.37	0.988	0.963	0.975
adjusted high	2430	60.51	2491	14.55	14.10	28.65	14.53	14.09	28.62	1.001	1.000	1.001
mid	2467	30.20	2497	7.24	7.02	14.26	7.31	7.07	14.38	0.991	0.992	0.992
low	2483	15.53	2499	3.72	3.61	7.33	3.79	3.68	7.47	0.982	0.980	0.981
calibrator zero	2494	0.00	2494	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
										Average C.F.=		
										0.992	0.991	0.991

Linear Regression/Calibration Results:

Correlation Coefficient =	CH ₄	NMHC	THC	LIMITS
Slope =	1.000	1.000	1.000	> or = 0.995
b (Intercept as % of full scale) =	0.997	0.998	0.998	0.95-1.05
% change in C.F. from last cal =	0.22%	0.21%	0.21%	± 3% F.S.
	1.21%	3.72%	2.46%	± 10%

As Left Instrument Diagnostics:

Interface Board Voltages:	Bias Supply:	-288.0	Calibration History cnt'd:	NM Peak Area:	91806
Temperatures:	Detector Oven:	175.0	Crucial Settings:	Methane Start:	n/a
	Filter:	175.0		Methane End:	n/a
	Column Oven:	75.1		Backflush:	n/a
	Internal:	31.4		NMHV Start:	n/a
Cylinder Pressures/reg.:	Carrier:	1400 50	Run History>1:	NMHC End:	n/a
	Fuel:	950 50		Date:	07Nov2017
	Span Gas:	1250 15		Time:	13:22
	Zero Air Generator:	55		CH ₄ PK HT:	0
Internal Pressures:	Carrier:	30.5		CH ₄ RT:	13.0
	Fuel:	40.0		CH ₄ Baseline:	1390
	Air:	24.8		CH ₄ LOD:	16
FID Status:	Status:	LIT		CH ₄ SD:	5
	Counts:	17600		CH ₄ CONC:	0.00
	Flame:	343.0		NM PK HT:	0
	Det Base:	175.0		NM Peak Area:	0
Flame and Power Stats:	Last Power On:	07Oct2017@02:24		NM CONC:	0.00
	Flameouts:	1		NM Base Start:	1367
	Det Oven at Start:	36.4		NM Base End:	1365
	Col Oven at Start:	32.1		NM LOD:	14
Calibration History:	Time:	07Nov2017@11:59		NM Start IDX:	10
	Type:	Span		NM End IDX:	82
	Status:	Good		NM Max Slope:	4.0e-01
	Check/Adjust:	Adjust		NM Min Slope:	-5.5e-01
	CH ₄ Span Conc:	14.55	Expected Values:	NM PT Count:	0
	CH ₄ SP Ratio:	0.000774		Previous CH ₄ :	8.9
	CH ₄ RT:	13.0		Previous NMHC:	10.24
	CH ₄ PK IDX:	25		Previous THC:	19.14
	CH ₄ PK HT:	18796		New CH ₄ :	9.09
	NM Span Conc:	14.10		New NMHC:	10.00
	NM SP Ratio:	0.000154		New THC:	19.09

Comments:

The analyzer sample inlet filter was changed.

No zero adjustment was required/made. As found zero values were copied to adjusted zero values for linearity calculation purposes.

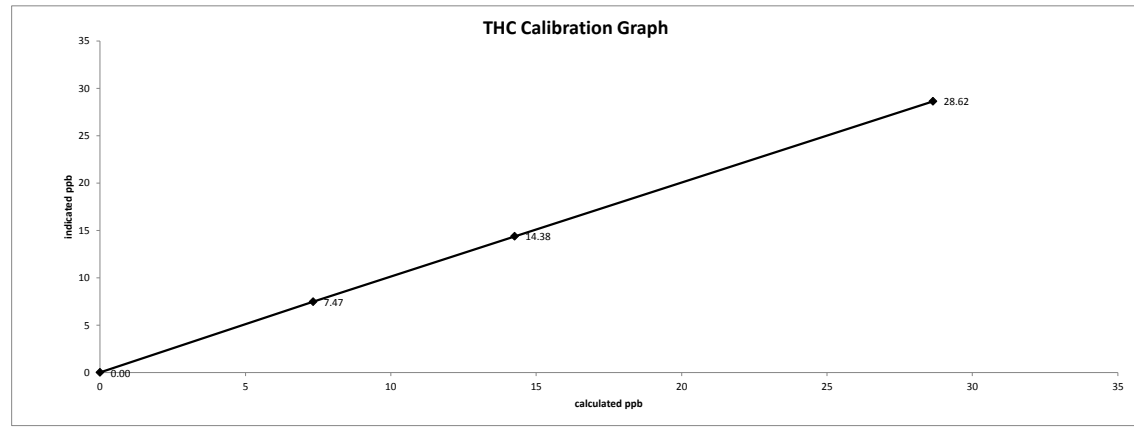
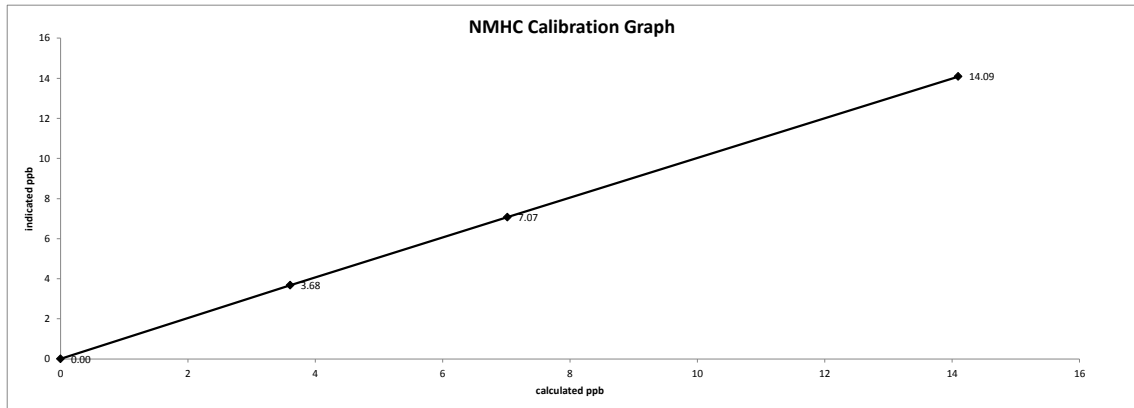
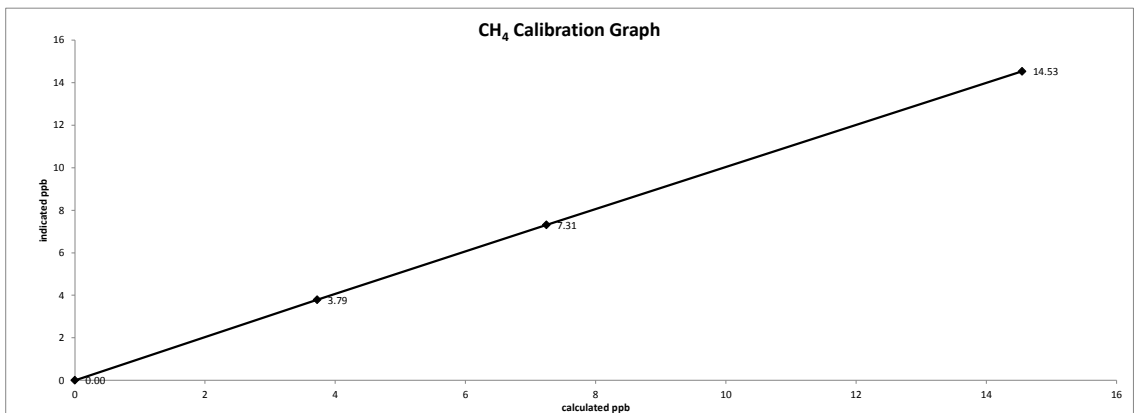
The analyzer cooling fan filter(s) were cleaned.

The manifold blower was found to be working normally.

Flow measurements after mid-point

Date: November 7, 2017
Company/Airshed: PRAMP
Location/Station Name: 842b

Start/End Time 24 hr. (mst): 10:53 / 14:24
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution



Station: PRAMP_842 Daily: 17/11/07 Type: AVG 1 Min. [1 Min.]



— CH4[ppm]

— NMHC[ppm]



Thermo 55i Methane/Non-Methane Analyzer Calibration

Date:	November 17, 2017	Barometer/B.P./units:	Brunton 05490 expires December 5, 2017	27.61	inHg
Company/Airshed:	PRAMP	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	20.17	°C
Location/Station Name:	842b	Weather Conditions:	Mainly sunny		
Parameter:	CH4 / NMHC / THC	Calibration Purpose:	shut down		
Start/End Time 24 hr. (mst):	13:35/15:30	Performed By/Reviewer:	Limin Li	Tom Bourque	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	January 9, 2021		

Analyzer: ID# or Serial Number: Measured Flow: Last Calibration Date: Range ppm:	1236656188 1123 November 7, 2017 20 CH4/20 NMHC/40 THC	Correction Factors:		
		Previous C.F.:	As Found C.F.:	New C.F.:
		CH ₄ = 1.001	0.990	n/a
		NMHC = 1.000	1.018	n/a
		THC = 1.001	1.003	n/a

Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires November 21, 2017	Standard Calibration Points for Analyzer Range of 20/20/40 ppm
High Flow Meter ID/Expiry Date:	Defender High 148944 expires November 21, 2017	
Calibrator ID/Expiry Date:	Sabio id# 17200415 expires May 16, 2018	
Cal Gas Cylinder I.D. #:	LL 19638	
CH ₄ Cylinder Conc. =	880.0 304.0 =C ₃ H ₈ Cylinder Conc.	
CH ₄ expressed as C ₃ H ₈ =	836.0 1716.0 =total CH ₄ equivalent	

Point	CH ₄	NMHC	THC
High	13.00	13.00	26.00
Mid	7.00	7.00	14.00
Low	3.00	3.00	6.00

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	Correction Factors:		
	Diluent	Cal Gas	Total Flow							CH ₄	NMHC	THC
as found zero	2935	0.00	2935	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2894	49.44	2943	14.78	14.04	28.83	14.93	13.80	28.73	0.990	1.018	1.003
mid	2917	25.94	2943	7.76	7.37	15.13	7.87	7.22	15.09	0.986	1.021	1.002
low	2937	12.33	2949	3.68	3.50	7.17	3.73	3.43	7.16	0.986	1.019	1.002
Average C.F. =										0.987	1.019	1.003

Linear Regression/Calibration Results:

	CH ₄	NMHC	THC	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.010	0.983	0.997	0.90-1.10
b (Intercept as % of full scale) =	0.06%	-0.03%	0.02%	± 3% F.S.
% change in C.F. from last cal =	1.08%	-1.77%	-0.24%	± 10%

As Left Instrument Diagnostics:

Interface Board Voltages:	Bias Supply: -287.5 V	Calibration History cnt'd:	NM Peak Area: 91806
Temperatures:	Detector Oven: 175.0 °C	Crucial Settings:	Methane Start: 8.0
	Filter: 175.0 °C		Methane End: 16.0
	Column Oven: 75.0 °C		Backflush: 18.0
	Internal: 27.8 °C		NMHV Start: 24.0
Cylinder Pressures/reg.:	Carrier: 1150 50	Run History>1:	NMHC End: 56.0
	Fuel: 750 50	Date:	17NOV17
	Span Gas: 1150 18	Time:	13:27
Internal Pressures:	Zero Air Generator: 55 PSI	CH ₄ PK HT:	2541
	Carrier: 30.5 PSI	CH ₄ RT:	12.8
	Fuel: 40.0 PSI	CH ₄ Baseline:	1273
	Air: 24.8 PSI	CH ₄ LOD:	17
FID Status:	Status: LIT	CH ₄ SD:	5
	Counts: 16419	CH ₄ CONC:	1.97
	Flame: 339.8 °C	NM PK HT:	0
	Det Base: 175.0 °C	NM Peak Area:	0
Flame and Power Stats:	Last Power On: 7Oct17@2:24	NM CONC:	0
	Flameouts: 1	NM Base Start:	1242
	Det Oven at Start: 36.4	NM Base End:	1251
	Col Oven at Start: 32.1	NM LOD:	11
Calibration History:	Time: 07NOV17 11:59	NM Start IDX:	4
	Type: SPAN	NM End IDX:	82
	Status: GOOD	NM Max Slope:	4.8e-01
	Check/Adjust: ADJUST	NM Min Slope:	-6.6e-01
	CH ₄ Span Conc: 14.55	NM PT Count:	0
	CH ₄ SP Ratio: 0.000774	Expected Values:	Previous CH ₄ : 9.09
	CH ₄ RT: 13.0		Previous NMHC: 10.00
	CH ₄ PK IDX: 25		Previous THC: 19.09
	CH ₄ PK HT: 18796		New CH ₄ : 8.90
	NM Span Conc: 14.1		New NMHC: 10.24
	NM SP Ratio: 0.000154		New THC: 19.14

Comments:

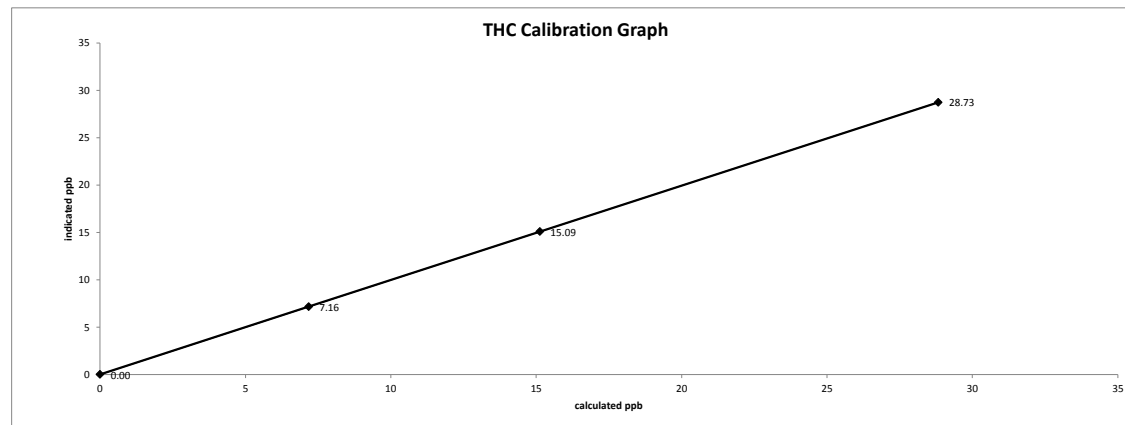
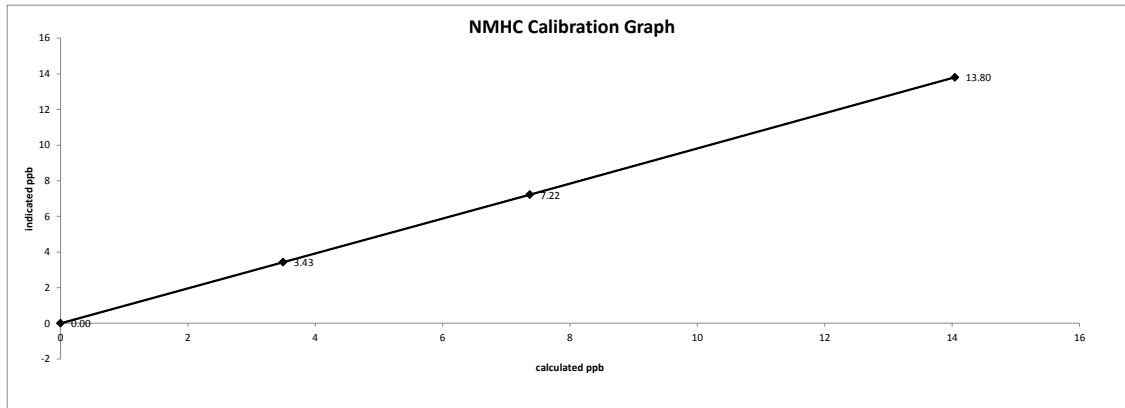
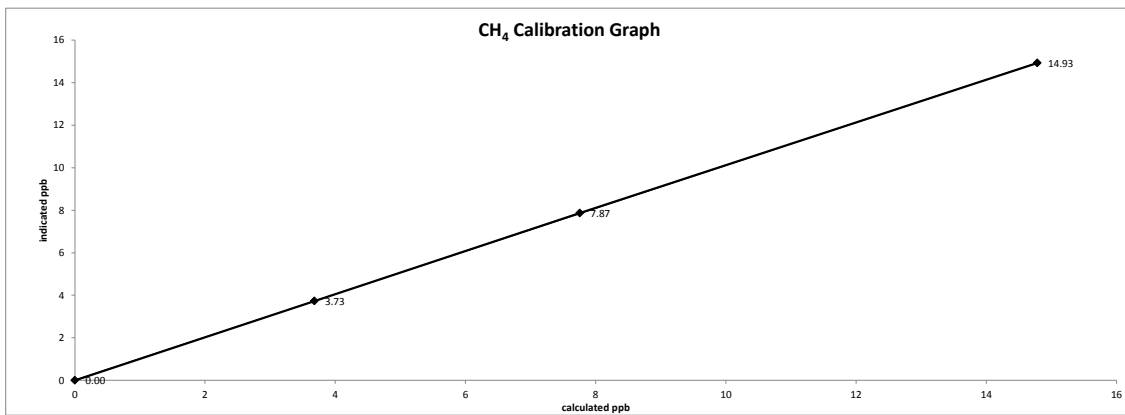
The manifold blower was found to be working normally.

Shut down analyzer prior to troubleshooting. Analyzer experienced intermittent injection problems from Nov 8th - 15th.

Flow measurements after mid-point

Date: November 17, 2017
Company/Airshed: PRAMP
Location/Station Name: 842b

Start/End Time 24 hr. (mst): 13:35/15:30
Calibration Purpose: shut down
Calibration Method: Gas Dilution





Thermo 55i Methane/Non-Methane Analyzer Calibration

Date: November 17, 2017 Company/Airshed: PRAMP Location/Station Name: 842b Parameter: CH4 / NMHC / THC Start/End Time 24 hr. (mst): 17:15/20:15 Calibration Method: Gas Dilution	Barometer/B.P./units: Brunton 05490 expires December 5, 2017 27.61 inHg Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018 20.17 °C Weather Conditions: Mainly sunny Calibration Purpose: post repair Performed By/Reviewer: Limin Li Tom Bourque Cal Gas Expiry Date: January 9, 2021
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Analyzer: ID# or Serial Number: 1236656188 Measured Flow: 1123 Last Calibration Date: November 7, 2017 Range ppm: 20 CH4/20 NMHC/40 THC	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>CH₄</td> <td>1.001</td> <td>n/a</td> <td>1.000</td> </tr> <tr> <td>NMHC</td> <td>1.000</td> <td>n/a</td> <td>1.000</td> </tr> <tr> <td>THC</td> <td>1.001</td> <td>n/a</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	CH ₄	1.001	n/a	1.000	NMHC	1.000	n/a	1.000	THC	1.001	n/a	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
CH ₄	1.001	n/a	1.000														
NMHC	1.000	n/a	1.000														
THC	1.001	n/a	1.000														

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires November 21, 2017 High Flow Meter ID/Expiry Date: Defender High 148944 expires November 21, 2017 Calibrator ID/Expiry Date: Sabio id# 17200415 expires May 16, 2018 Cal Gas Cylinder I.D. #: LL 19638 CH4 Cylinder Conc.: 880.0 304.0 =C ₃ H ₈ Cylinder Conc. CH₄ expressed as C₃H₈: 836.0 1716.0 =total CH4 equivalent	Standard Calibration Points for Analyzer Range of 20/20/40 ppm <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>CH4</th> <th>NMHC</th> <th>THC</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>13.00</td> <td>13.00</td> <td>26.00</td> </tr> <tr> <td>Mid</td> <td>7.00</td> <td>7.00</td> <td>14.00</td> </tr> <tr> <td>Low</td> <td>3.00</td> <td>3.00</td> <td>6.00</td> </tr> </tbody> </table>	Point	CH4	NMHC	THC	High	13.00	13.00	26.00	Mid	7.00	7.00	14.00	Low	3.00	3.00	6.00
Point	CH4	NMHC	THC														
High	13.00	13.00	26.00														
Mid	7.00	7.00	14.00														
Low	3.00	3.00	6.00														

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Correction Factors:								
Point	Diluent	Cal Gas	Total Flow	Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	CH ₄	NMHC	THC
adjusted zero	2941	0.00	2941	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2896	49.61	2946	14.82	14.08	28.90	14.82	14.08	28.90	1.000	1.000	1.000
mid	2916	25.99	2942	7.77	7.39	15.16	7.84	7.39	15.23	0.992	0.999	0.995
low	2936	12.22	2948	3.65	3.47	7.11	3.69	3.49	7.18	0.989	0.993	0.991
calibrator zero	2941	0.00	2941	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
Average C.F. =										0.993	0.997	0.995

Linear Regression/Calibration Results:

	CH ₄	NMHC	THC	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.000	1.000	0.95-1.05
b (Intercept as % of full scale) =	0.15%	0.05%	0.10%	± 3% F.S.
% change in C.F. from last cal =	n/a	n/a	n/a	n/a

As Left Instrument Diagnostics:

Interface Board Voltages: Bias Supply: -287.5 V Temperatures: Detector Oven: 175.0 °C Filter: 175.0 °C Column Oven: 75.0 °C Internal: 26.5 °C Cylinder Pressures/reg.: Carrier: 1150 50 Fuel: 750 50 Span Gas: 1150 18 Zero Air Generator: 55 PSI Internal Pressures: Carrier: 30.5 PSI Fuel: 40.0 PSI Air: 24.8 PSI FID Status: Status: LIT Counts: 16694 Flame: 340.0 °C Det Base: 175.0 °C Flame and Power Stats: Last Power On: 7Oct17@2:24 Flameouts: 1 Det Oven at Start: 36.4 Col Oven at Start: 32.1 Calibration History: Time: 17NOV17 17:45 Type: SPAN Status: GOOD Check/Adjust: ADJUST CH ₄ Span Conc: 14.82 CH ₄ SP Ratio: 0.00077 CH ₄ RT: 12.8 CH ₄ PK IDX: 24 CH ₄ PK HT: 19257 NM Span Conc: 14.08 NM SP Ratio: 0.000158	Calibration History cnt'd: Crucial Settings: NM Peak Area: 89375 Methane Start: 8.0 Methane End: 16.0 Backflush: 18.0 NMHV Start: 24.0 NMHC End: 56.0 Date: 17NOV17 Time: 19:44 CH ₄ PK HT: 0 CH ₄ RT: 8.0 CH ₄ Baseline: 1295 CH ₄ LOD: 24 CH ₄ SD: 8 CH ₄ CONC: 0 NM PK HT: 0 NM Peak Area: 0 NM CONC: 0 NM Base Start: 1272 NM Base End: 1277 NM LOD: 19 NM Start IDX: 8 NM End IDX: 65 NM Max Slope: 3.9e-01 NM Min Slope: -5.5e-01 NM PT Count: 0 Previous CH ₄ : 9.09 Previous NMHC: 10.00 Previous THC: 19.09 New CH ₄ : 8.90 New NMHC: 10.24 New THC: 19.14	Run History>1: Time: 19:44 CH ₄ PK HT: 0 CH ₄ RT: 8.0 CH ₄ Baseline: 1295 CH ₄ LOD: 24 CH ₄ SD: 8 CH ₄ CONC: 0 NM PK HT: 0 NM Peak Area: 0 NM CONC: 0 NM Base Start: 1272 NM Base End: 1277 NM LOD: 19 NM Start IDX: 8 NM End IDX: 65 NM Max Slope: 3.9e-01 NM Min Slope: -5.5e-01 NM PT Count: 0 Previous CH ₄ : 9.09 Previous NMHC: 10.00 Previous THC: 19.09 New CH ₄ : 8.90 New NMHC: 10.24 New THC: 19.14
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Comments:

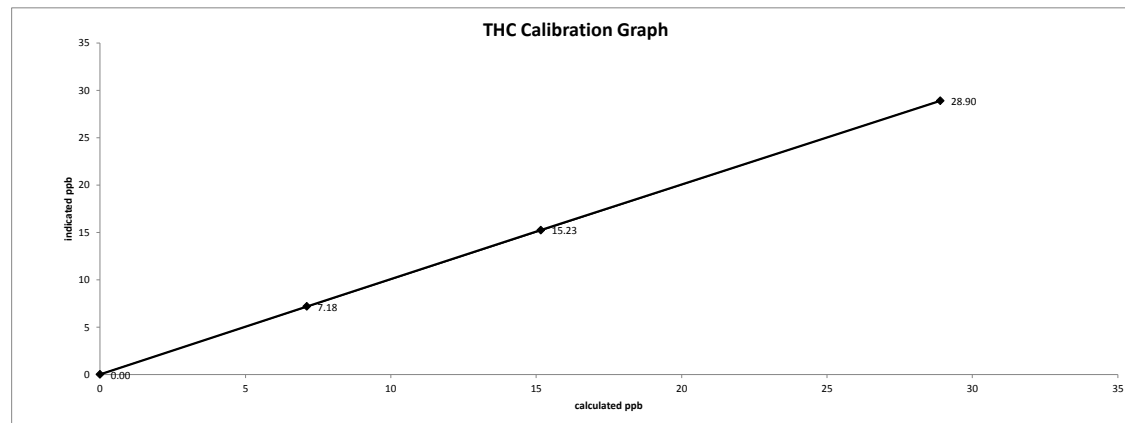
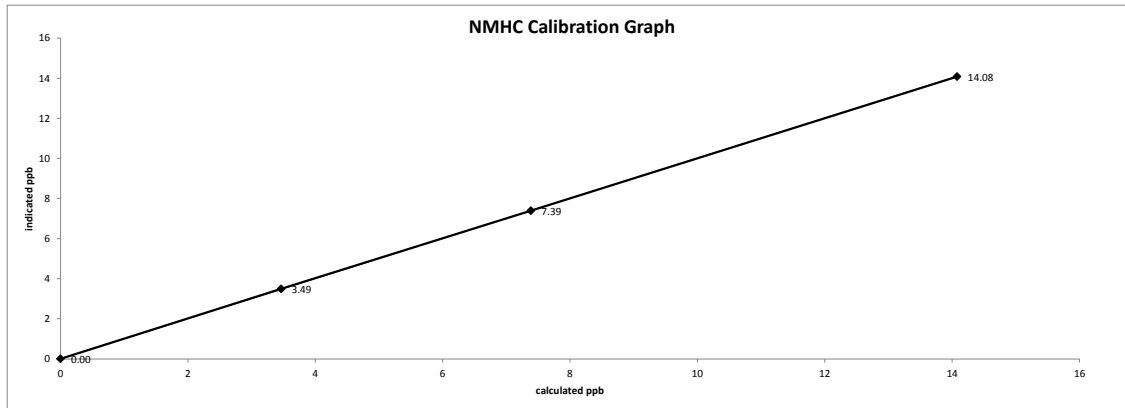
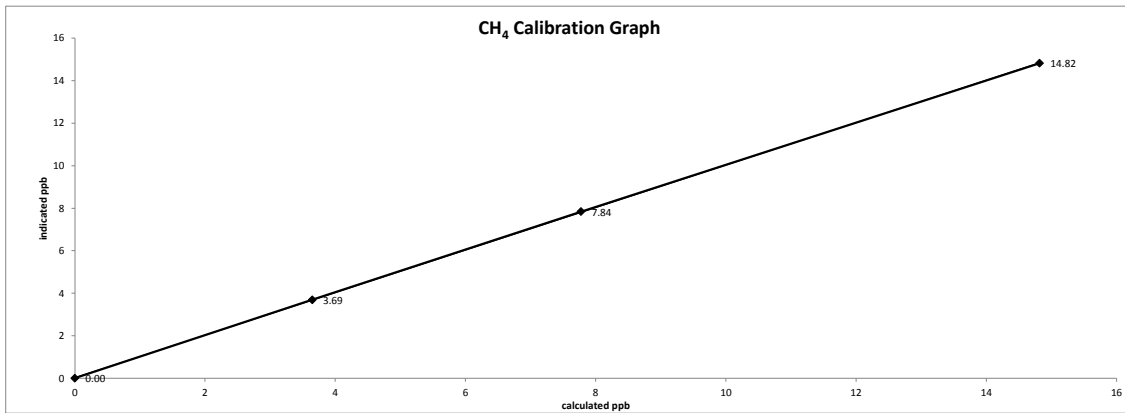
The manifold blower was found to be working normally.

The following repair was performed: checked and tightened fittings inside the column chamber and re-aligned actuator.

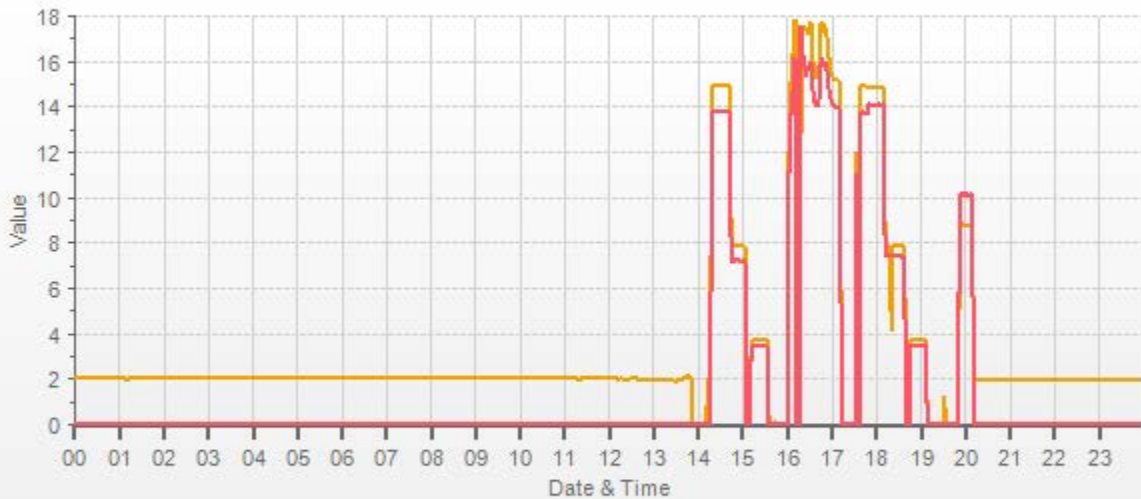
Flow measurements after mid-point

Date: November 17, 2017
Company/Airshed: PRAMP
Location/Station Name: 842b

Start/End Time 24 hr. (mst): 17:15/20:15
Calibration Purpose: post repair
Calibration Method: Gas Dilution



Station: PRAMP_842 Daily: 17/11/17 Type: AVG 1 Min. [1 Min.]



— CH4[ppm]

— NMHC[ppm]



Thermo 55i Methane/Non-Methane Analyzer Calibration

Date: November 23, 2017	Barometer/B.P./units: Brunton 05490 expires December 5, 2017	27.03	inHg
Company/Airshed: PRAMP	Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018	21	°C
Location/Station Name: 842B	Weather Conditions: Cloudy/Overcast		
Parameter: CH4 / NMHC / THC	Calibration Purpose: shut down		
Start/End Time 24 hr. (mst): 10:00/12:21	Performed By/Reviewer: Limin Li Rob Fisher		
Calibration Method: Gas Dilution	Cal Gas Expiry Date: January 9, 2021		

Analyzer: ID# or Serial Number: 1236656188 Measured Flow: 1120 Last Calibration Date: November 17, 2017 Range ppm: 20 CH4/20 NMHC/40 THC	Correction Factors: <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">Previous C.F.:</td> <td style="text-align: center;">As Found C.F.:</td> <td style="text-align: center;">New C.F.:</td> </tr> <tr> <td>CH₄ =</td> <td style="text-align: center;">1.000</td> <td style="text-align: center;">1.012</td> <td style="text-align: center;">n/a</td> </tr> <tr> <td>NMHC =</td> <td style="text-align: center;">1.000</td> <td style="text-align: center;">1.019</td> <td style="text-align: center;">n/a</td> </tr> <tr> <td>THC =</td> <td style="text-align: center;">1.000</td> <td style="text-align: center;">1.015</td> <td style="text-align: center;">n/a</td> </tr> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	CH ₄ =	1.000	1.012	n/a	NMHC =	1.000	1.019	n/a	THC =	1.000	1.015	n/a
	Previous C.F.:	As Found C.F.:	New C.F.:														
CH ₄ =	1.000	1.012	n/a														
NMHC =	1.000	1.019	n/a														
THC =	1.000	1.015	n/a														

Calibration Standards: Low Flow Meter ID/Expiry Date: DC Lite Low 4425 expires February 3, 2018 High Flow Meter ID/Expiry Date: DC Lite High 108646 expires February 3, 2018 Calibrator ID/Expiry Date: Enviroconics id# 1991 expires March 16, 2018 Cal Gas Cylinder I.D. #: LL 19638 CH ₄ Cylinder Conc.: 880.0 304.0 =C ₃ H ₈ Cylinder Conc. CH ₄ expressed as C ₃ H ₈ : 836.0 1716.0 =total CH ₄ equivalent	Standard Calibration Points for Analyzer Range of 20/20/40 ppm <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th>Point</th> <th>CH₄</th> <th>NMHC</th> <th>THC</th> </tr> <tr> <td>High</td> <td style="text-align: center;">13.00</td> <td style="text-align: center;">13.00</td> <td style="text-align: center;">26.00</td> </tr> <tr> <td>Mid</td> <td style="text-align: center;">7.00</td> <td style="text-align: center;">7.00</td> <td style="text-align: center;">14.00</td> </tr> <tr> <td>Low</td> <td style="text-align: center;">3.00</td> <td style="text-align: center;">3.00</td> <td style="text-align: center;">6.00</td> </tr> </table>	Point	CH ₄	NMHC	THC	High	13.00	13.00	26.00	Mid	7.00	7.00	14.00	Low	3.00	3.00	6.00
Point	CH ₄	NMHC	THC														
High	13.00	13.00	26.00														
Mid	7.00	7.00	14.00														
Low	3.00	3.00	6.00														

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	Correction Factors:		
	Diluent	Cal Gas	Total Flow							CH ₄	NMHC	THC
as found zero	2956	0.00	2956	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2908	46.81	2955	13.94	13.24	27.18	13.78	13.00	26.78	1.012	1.019	1.015
mid	2932	23.43	2955	6.98	6.63	13.61	6.92	6.48	13.40	1.008	1.023	1.015
low	2943	12.15	2955	3.62	3.44	7.06	3.55	3.34	6.89	1.019	1.029	1.024
Average C.F. =										1.013	1.024	1.018

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000 Slope = 0.989 b (Intercept as % of full scale) = -0.03% % change in C.F. from last cal = -1.16%	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th>CH₄</th> <th>NMHC</th> <th>THC</th> </tr> <tr> <td style="text-align: center;">1.000</td> <td style="text-align: center;">1.000</td> <td style="text-align: center;">1.000</td> </tr> <tr> <td style="text-align: center;">0.989</td> <td style="text-align: center;">0.982</td> <td style="text-align: center;">0.986</td> </tr> <tr> <td style="text-align: center;">-0.03%</td> <td style="text-align: center;">-0.09%</td> <td style="text-align: center;">-0.06%</td> </tr> <tr> <td style="text-align: center;">-1.16%</td> <td style="text-align: center;">-1.87%</td> <td style="text-align: center;">-1.51%</td> </tr> </table>	CH ₄	NMHC	THC	1.000	1.000	1.000	0.989	0.982	0.986	-0.03%	-0.09%	-0.06%	-1.16%	-1.87%	-1.51%
CH ₄	NMHC	THC														
1.000	1.000	1.000														
0.989	0.982	0.986														
-0.03%	-0.09%	-0.06%														
-1.16%	-1.87%	-1.51%														

LIMITS
> or = 0.995
0.90-1.10
± 3% F.S.
± 10%

As Left Instrument Diagnostics:

Interface Board Voltages: Bias Supply: -287.7 V Temperatures: Detector Oven: 175.0 °C Filter: 175.0 °C Column Oven: 75.1 °C Internal: 29.1 °C Cylinder Pressures/reg.: Carrier: 1000 50 Fuel: 500 50 Span Gas: 1050 18 Zero Air Generator: 55 PSI Internal Pressures: Carrier: 30.5 PSI Fuel: 40.0 PSI Air: 24.9 PSI FID Status: Status: LIT Counts: 16243 Flame: 337.2 °C Det Base: 175.0 °C Flame and Power Stats: Last Power On: 17NOV17 15:36:11 Flameouts: 1 Det Oven at Start: 168.1 Col Oven at Start: 74.1 Calibration History: Time: 17/NOV/17 17:45 Type: SPAN Status: GOOD Check/Adjust: ADJUST CH ₄ Span Conc: 14.82 CH ₄ SP Ratio: 0.00077 CH ₄ RT: 12.8 CH ₄ PK IDX: 24 CH ₄ PK HT: 19257 NM Span Conc: 14.08 NM SP Ratio: 0.000158	Calibration History cnt'd: NM Peak Area: 89375 Methane Start: 8 Methane End: 16 Backflush: 18 NMHV Start: 24 NMHC End: 56 Run History>1: Date: 23NOV17 Time: 09:44 CH ₄ PK HT: 2495 CH ₄ RT: 12.8 CH ₄ Baseline: 1243 CH ₄ LOD: 20 CH ₄ SD: 6 CH ₄ CONC: 1.92 NM PK HT: 0 NM Peak Area: 0 NM CONC: 0 NM Base Start: 1208 NM Base End: 1221 NM LOD: 14 NM Start IDX: 14 NM End IDX: 89 NM Max Slope: 8.1e-01 NM Min Slope: -5.0e-01 NM PT Count: 0 Expected Values: Previous CH ₄ : 8.9 Previous NMHC: 10.24 Previous THC: 19.14 New CH ₄ : 8.90 New NMHC: 10.24 New THC: 19.14
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Comments:

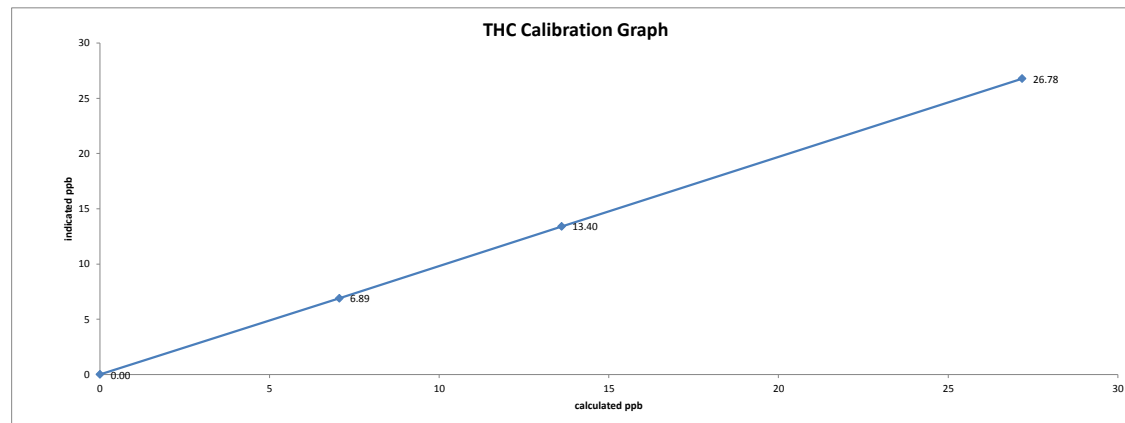
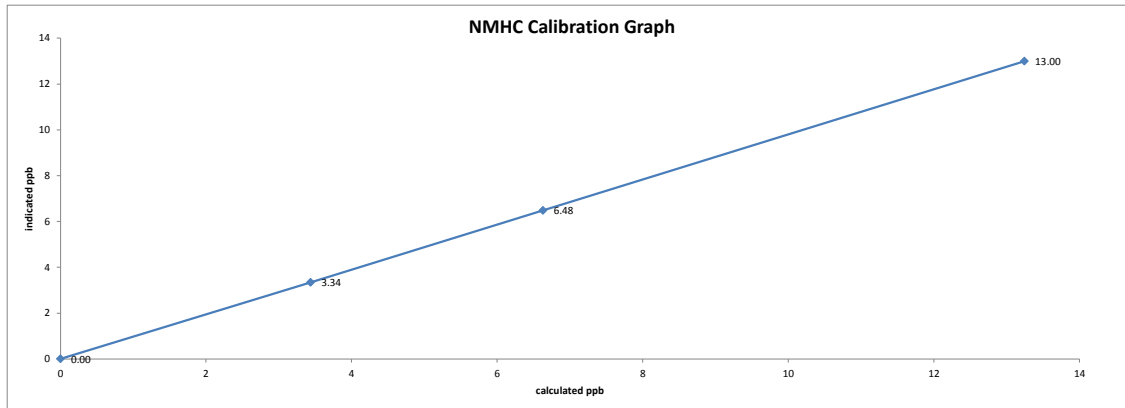
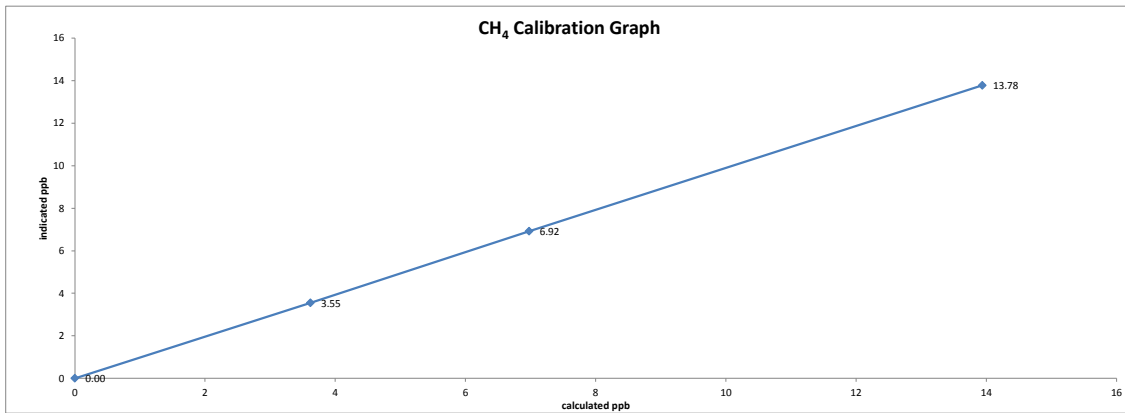
The manifold blower was found to be working normally.

Analyzer 1236656188 was shutdown due to infrequent injection issues

Flow measurements after mid-point

Date: November 23, 2017
Company/Airshed: PRAMP
Location/Station Name: 842B

Start/End Time 24 hr. (mst): 10:00/12:21
Calibration Purpose: shut down
Calibration Method: Gas Dilution





Thermo 55i Methane/Non-Methane Analyzer Calibration

Date: November 23, 2017 Company/Airshed: PRAMP Location/Station Name: 842B Parameter: CH4 / NMHC / THC Start/End Time 24 hr. (mst): 15:25/19:20 Calibration Method: Gas Dilution	Barometer/B.P./units: Brunton 05490 expires December 5, 2017 27.06 inHg Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018 22 °C Weather Conditions: Cloudy/Overcast Calibration Purpose: installation Performed By/Reviewer: Limin Li Rob Fisher Cal Gas Expiry Date: January 9, 2021
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Analyzer: ID# or Serial Number: 1505664392 Measured Flow: 1.247 LPM Last Calibration Date: n/a Range ppm: 20 CH4/20 NMHC/40 THC	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>CH₄</td> <td>1.000</td> <td>n/a</td> <td>0.998</td> </tr> <tr> <td>NMHC</td> <td>1.000</td> <td>n/a</td> <td>0.998</td> </tr> <tr> <td>THC</td> <td>1.000</td> <td>n/a</td> <td>0.998</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	CH ₄	1.000	n/a	0.998	NMHC	1.000	n/a	0.998	THC	1.000	n/a	0.998
	Previous C.F.:	As Found C.F.:	New C.F.:														
CH ₄	1.000	n/a	0.998														
NMHC	1.000	n/a	0.998														
THC	1.000	n/a	0.998														

Calibration Standards: Low Flow Meter ID/Expiry Date: DC Lite Low 4425 expires February 3, 2018 High Flow Meter ID/Expiry Date: DC Lite High 108646 expires February 3, 2018 Calibrator ID/Expiry Date: Enviroconics id# 1991 expires March 16, 2018 Cal Gas Cylinder I.D. #: LL 19638 CH4 Cylinder Conc.: 880.0 304.0 =C ₃ H ₈ Cylinder Conc. CH₄ expressed as C₃H₈: 836.0 1716.0 =total CH4 equivalent	Standard Calibration Points for Analyzer Range of 20/20/40 ppm <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>CH4</th> <th>NMHC</th> <th>THC</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>13.00</td> <td>13.00</td> <td>26.00</td> </tr> <tr> <td>Mid</td> <td>7.00</td> <td>7.00</td> <td>14.00</td> </tr> <tr> <td>Low</td> <td>3.00</td> <td>3.00</td> <td>6.00</td> </tr> </tbody> </table>	Point	CH4	NMHC	THC	High	13.00	13.00	26.00	Mid	7.00	7.00	14.00	Low	3.00	3.00	6.00
Point	CH4	NMHC	THC														
High	13.00	13.00	26.00														
Mid	7.00	7.00	14.00														
Low	3.00	3.00	6.00														

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated						Correction Factors:		
Point	Diluent	Cal Gas	Total Flow	CH ₄ (ppm)	NMHC (ppm)	THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	CH ₄	NMHC	THC
adjusted zero	2952	0.00	2952	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2905	46.89	2952	13.98	13.28	27.26	14.00	13.30	27.30	0.998	0.998	0.998
mid	2927	23.35	2950	6.97	6.62	13.58	7.00	6.67	13.67	0.995	0.992	0.994
low	2939	12.13	2951	3.62	3.44	7.05	3.59	3.49	7.08	1.008	0.985	0.996
calibrator zero	2952	0.00	2952	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
Average C.F. =										1.000	0.992	0.996

Linear Regression/Calibration Results:

	CH ₄	NMHC	THC	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.003	1.001	1.002	0.95-1.05
b (Intercept as % of full scale) =	-0.04%	0.14%	0.05%	± 3% F.S.
% change in C.F. from last cal =	n/a	n/a	n/a	n/a

As Left Instrument Diagnostics:

Interface Board Voltages: Bias Supply: -293.8 V Temperatures: Detector Oven: 175.1 °C Filter: 175.0 °C Column Oven: 75.1 °C Internal: 33.7 °C Cylinder Pressures/reg.: Carrier: 2400 50 Fuel: 500 50 Span Gas: 1050 18 Zero Air Generator: 50 PSI Internal Pressures: Carrier: 31.1 PSI Fuel: 47.4 PSI Air: 23.7 PSI FID Status: Status: LIT Counts: 35239 Flame: 387.3 °C Det Base: 175.0 °C Flame and Power Stats: Last Power On: 23NOV17 12:46:25 Flameouts: 1 Det Oven at Start: 143.0 Col Oven at Start: 32.4 Calibration History: Time: 23/NOV/17 16:33 Type: SPAN Status: GOOD Check/Adjust: ADJUST CH ₄ Span Conc: 13.98 CH ₄ SP Ratio: 0.000738 CH ₄ RT: 12.4 CH ₄ PK IDX: 22 CH ₄ PK HT: 18942 NM Span Conc: 13.24 NM SP Ratio: 0.000179	Calibration History cnt'd: Crucial Settings: NM Peak Area: 73957 Methane Start: 8 Methane End: 16 Backflush: 18 NMHV Start: 25 NMHC End: 54 Date: 23NOV17 Time: 17:41 CH ₄ PK HT: 0 CH ₄ RT: 12.6 CH ₄ Baseline: 24 CH ₄ LOD: 15 CH ₄ SD: 5 CH ₄ CONC: 0 NM PK HT: 0 NM Peak Area: 0 NM CONC: 0 NM Base Start: 0 NM Base End: 21 NM LOD: 14 NM Start IDX: 15 NM End IDX: 89 NM Max Slope: 1.3e+00 NM Min Slope: -5.7e-01 NM PT Count: 0 Previous CH ₄ : 8.8 Previous NMHC: 10.1 Previous THC: 18.9 New CH ₄ : 8.80 New NMHC: 10.10 New THC: 18.90	Run History>1: Time: 17:41 CH ₄ PK HT: 0 CH ₄ RT: 12.6 CH ₄ Baseline: 24 CH ₄ LOD: 15 CH ₄ SD: 5 CH ₄ CONC: 0 NM PK HT: 0 NM Peak Area: 0 NM CONC: 0 NM Base Start: 0 NM Base End: 21 NM LOD: 14 NM Start IDX: 15 NM End IDX: 89 NM Max Slope: 1.3e+00 NM Min Slope: -5.7e-01 NM PT Count: 0 Previous CH ₄ : 8.8 Previous NMHC: 10.1 Previous THC: 18.9 New CH ₄ : 8.80 New NMHC: 10.10 New THC: 18.90
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Comments:

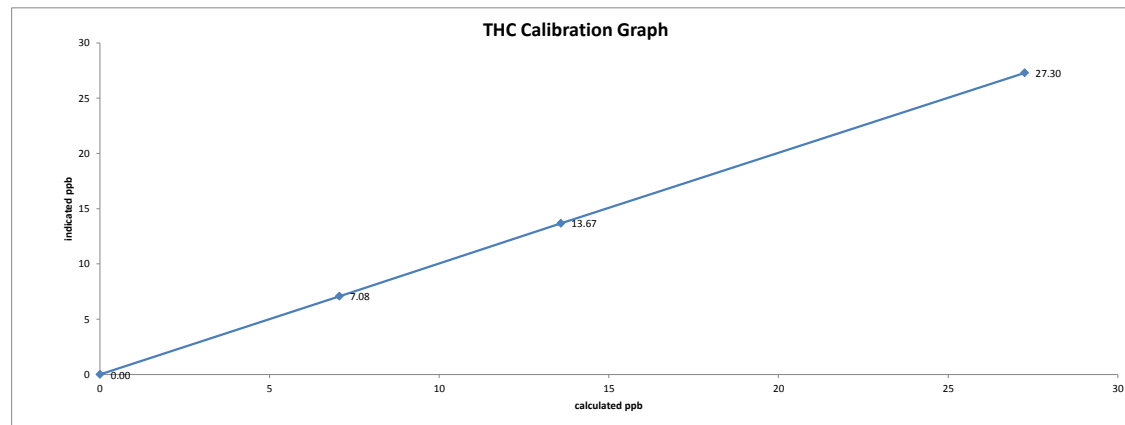
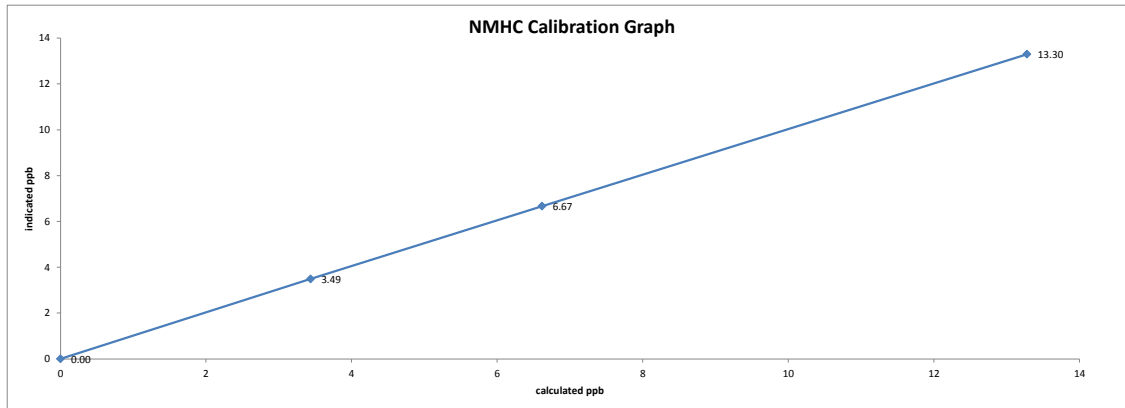
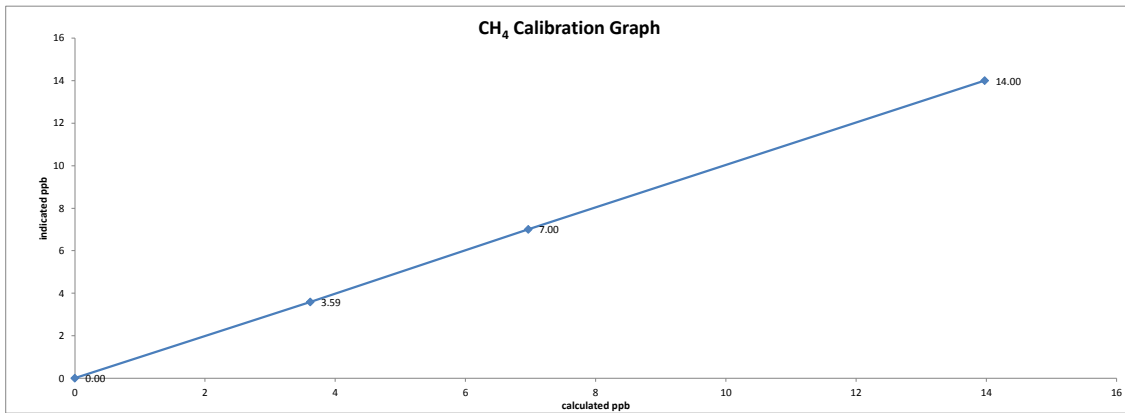
The manifold blower was found to be working normally.

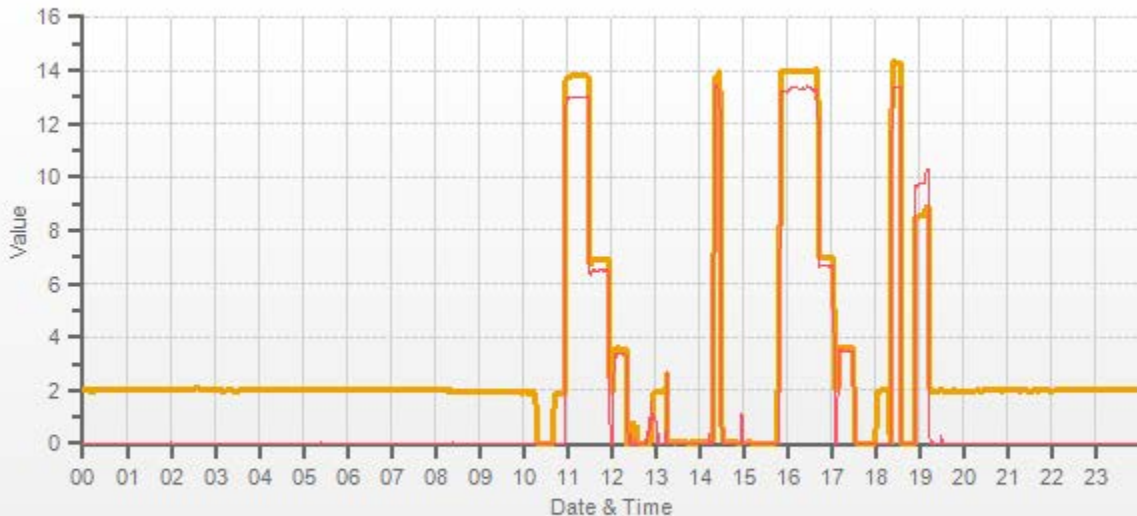
Analyzer 1236656188 was removed (due to infrequent injection issues) from service and replaced with Analyzer 1505664392. The N2 gas was changed and a blank run was performed. "zero chromatogram".

Flow measurements after mid-point

Date: **November 23, 2017**
Company/Airshed: **PRAMP**
Location/Station Name: **842B**

Start/End Time 24 hr. (mst): **15:25/19:20**
Calibration Purpose: **installation**
Calibration Method: **Gas Dilution**





CH4[ppm] NMHC[ppm]

WIND SYSTEM

Meteorological Sensor Audit/Calibration

Location Information

Company: PRAMP	Performed By: Chris Wesson
Audit Location: 842b	Reviewed By: Tom Bourque
Audit Date: August 30, 2017	Start /EndTime (mst): 10:50 / 11:20
Calibration Purpose: installation	Weather Conditions: Cloudy/Overcast

Wind Sensor Information

Sensor ID Data:	Sensor Outputs:
Sensor Make: RM Young	Velocity Voltage Output Range: 0-1V
Sensor Model: 05305VK	Velocity Unit Output Range: 0-200kmh
Serial #: 124638	Direction Voltage Output Range: 0-1V
Previous Cal/Audit Date: n/a or unknown	Direction Unit Output Range: 0-360°

Wind Calibrator Information

Calibrator Make/ Model: RM Young	Serial #: CA 4039
Maxxam Unit ID #: n/a	Certification Date: February 24, 2017

Wind Speed Audit Data ****+/- 2% of the average correction factor is the limit****

RPM	Wind Speed Generated kph	Clockwise Wind Speed kph	Counter Clockwise Wind Speed kph	Correction Factor
0	0	0.1	0.1	-
1000	18.4	18.4	18.5	1.000
2000	36.9	36.7	36.7	1.004
3000	55.3	55.1	55.1	1.004
4000	73.7	73.4	73.4	1.004
5000	92.2	91.8	91.8	1.004
6000	110.6	110.2	110.2	1.003
7000	129.0	128.6	128.6	1.003
8000	147.4	147.1	147.0	1.003
9000	165.9	165.5	165.5	1.002
10000	184.3	184.2	184.1	1.001
The audit meets AMD requirements.			Average Correction Factor=	1.003

Wind Direction Audit Data ****+/- 5° of the absolute average degrees difference for all points is the limit****

Generated Wind Direction 0-360 (Up)	Generated Wind Direction 360-0 (Down)	Indicated Wind Direction 0-360 (Up)	Indicated Wind Direction 360-0 (Down)	Degrees Difference 0-360 (Up)	Degrees Difference 360-0 (Down)	Average Absolute Degrees Difference
0	355	1	353	0.5	2.0	1.3
30	330	28	329	2.0	1.0	1.5
60	300	59	299	1.0	1.0	1.0
90	270	89	269	1.0	1.0	1.0
120	240	118	239	2.0	1.0	1.5
150	210	149	209	1.0	1.0	1.0
180	180	178	179	2.0	1.0	1.5
210	150	208	150	2.0	0.0	1.0
240	120	238	119	2.0	1.0	1.5
270	90	268	89	2.0	1.0	1.5
300	60	298	59	2.0	1.0	1.5
330	30	328	29	2.0	1.5	1.8
355	0	353	0	2.0	0.4	1.2
The audit meets AMD requirements.			Average Absolute Degrees Difference=			1.3

Comments:

CALIBRATORS

Company <u>Maxxam</u>		Operator: <u>Micheal Espiritu</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>Mesa Defender 530</u>
Serial Number	<u>17100415</u>	Serial Number	<u>L-152019 H-148944</u>
Last Verification Date	<u>May 2016</u>	Temperature (°C)	<u>25.0 C</u>
NO Cylinder S/N	<u>EY0000597</u>	Barometric Pressure	<u>697 mmhg</u>
NO [PPM]	<u>49.0</u>	NOx [PPM]	<u>49.0</u>
Expiry Date	<u>December 2019</u>		

Dilution Flow (sccm)		
Pt. #1 <u>5000</u>	Pt. #2 <u>5000</u>	Pt. #3 <u>5000</u>
Gas Flow (sccm)		
Pt. #1 <u>80</u>	Pt. #2 <u>40</u>	Pt. #3 <u>20</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4996	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5029	80.3	0.784	0.783	0.808	-0.013	0.794	3%	1%
5054	38.8	0.376	0.376	0.392	-0.006	0.386	4%	3%
5051	19.5	0.189	0.189	0.196	-0.003	0.193	4%	2%
Absolute Average Percent Difference							4%	2%


LINEAR REGRESSION ANALYSIS			<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>		
NO		LIMITS		NOx	
Correlation=	1.0000	≥	0.990	Correlation=	1.0000
m (Slope)=	1.0311		0.90-1.10	m (Slope)=	1.0140
b (Intercept % of FS)=	0.1350	±	3% F.S.	b (Intercept % of FS)=	0.1531

Flow	O ₂ Conc (LC)	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5029	0.000	0.000	0.803	-0.013	0.790	NO ₂	% Diff. Limit
5029	1.508	0.568	0.235	0.552	0.787	-1%	± 10%
5029	0.882	0.312	0.491	0.298	0.789	0%	± 10%
5029	0.390	0.108	0.695	0.095	0.789	0%	± 10%
Absolute Average Percent Difference						0%	± 10%

LINEAR REGRESSION ANALYSIS			<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>		
NO₂		LIMITS			
Correlation=	1.0000	≥	0.995		
m (Slope)=	0.9945		0.90-1.10		
b (Intercept % of FS)=	-1.2646	±	3% F.S.		

AENV Standards		NO_x Analyzer	
Audit Calibrator		Make/Model	<u>Teco 42i</u>
Make/Model	<u>Teco 146i</u>	Serial/AMU Number	<u>AMU 1868</u>
Serial/AMU Number	<u>AMU 1809</u>	Last Calibration Date	<u>May 16, 2017</u>
SRM Gas Cylinder No.	<u>CAL018101</u>	Full Scale (ppm)	<u>1.0</u>
Cylinder Conc. (ppm)	<u>48.79</u>	Cylinder Gas Expiry Date	<u>March 2019</u>

COMMENTS: Contains 50.4 ppm SO₂.

Auditor: Al Clark
Operator Signature: 

Date: May 16, 2017
Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Micheal Espiritu</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>Mesa Defender 530</u>
Serial Number	<u>17200415</u>	Serial Number	<u>L-152019 H-148944</u>
Last Verification Date	<u>May 2016</u>	Temperature (°C)	<u>25.0 C</u>
NO Cylinder S/N	<u>EY0000597</u>	Barometric Pressure	<u>697 mmhg</u>
NO [PPM]	<u>49.0</u>	NOx [PPM]	<u>49.0</u>
Expiry Date	<u>December 2019</u>		

Dilution Flow (sccm)		
Pt. #1 <u>5000</u>	Pt. #2 <u>5000</u>	Pt. #3 <u>5000</u>
Gas Flow (sccm)		
Pt. #1 <u>80</u>	Pt. #2 <u>40</u>	Pt. #3 <u>20</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5028	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
4930	78.7	0.783	0.783	0.809	-0.012	0.797	3%	2%
4936	38.6	0.383	0.383	0.396	-0.006	0.390	3%	2%
4935	19.4	0.193	0.193	0.199	-0.003	0.196	3%	2%
Absolute Average Percent Difference							3%	2%

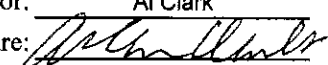
LINEAR REGRESSION ANALYSIS			<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>		
NO		LIMITS		NOx	
Correlation=	1.0000	≥	0.990	Correlation=	1.0000
m (Slope)=	1.0334		0.90-1.10	m (Slope)=	1.0181
b (Intercept % of FS)=	-0.0105	±	3% F.S.	b (Intercept % of FS)=	-0.0148

Flow	O ₂ Conc (LC)	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4930	0.000	0.000	0.806	-0.013	0.795	NO ₂	% Diff. Limit
4930	1.425	0.523	0.283	0.511	0.794	0%	± 10%
4930	0.825	0.278	0.528	0.266	0.795	0%	± 10%
4930	0.386	0.095	0.711	0.085	0.796	3%	± 10%
Absolute Average Percent Difference						1%	± 10%

LINEAR REGRESSION ANALYSIS			<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>		
NO₂		LIMITS			
Correlation=	1.0000	≥	0.995		
m (Slope)=	0.9998		0.90-1.10		
b (Intercept % of FS)=	-1.1702	±	3% F.S.		

AENV Standards		NO_x Analyzer	
Audit Calibrator			
Make/Model	<u>Teco 146i</u>	Make/Model	<u>Teco 42i</u>
Serial/AMU Number	<u>AMU 1809</u>	Serial/AMU Number	<u>AMU 1868</u>
SRM Gas Cylinder No.	<u>CAL018101</u>	Last Calibration Date	<u>May 16, 2017</u>
Cylinder Conc. (ppm)	<u>48.79</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>March 2019</u>

COMMENTS: Contains 50.4 ppm SO₂.

Auditor: Al Clark
Operator Signature: 

Date: May 16, 2017
Location: McIntyre Center Edmonton

Company: Maxxam **Operator:** Mike

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>Bios Defender 530+</u>
Serial Number	<u>830</u>	Serial Number	<u>Hi148944 Lo 152019</u>
Last Verification Date	<u>January 19, 2016</u>	Temperature (°C)	<u>24.6</u>
SO ₂ Cylinder Conc.	<u>50.5</u>	Barometric Pressure	<u>701.4mmHg</u>
SO ₂ Cylinder S/N	<u>EY0000769</u>		
Expiry Date	<u>December 8, 2019</u>		

Flow Measurements

Pt. No. 1 78.0 **Pt. No. 2** 37.7 **Pt. No. 3** 18.6

Calibrator Flow (sccm)	Calculated Concentration (ppm)	Indicated Concentration (ppm)	% Difference	
			vs Audit Gas	% Diff. Limit
4978	0.0000	0.0000		
4974	0.7920	0.7912	0%	± 10%
4978	0.3825	0.3825	0%	± 10%
4975	0.1900	0.1908	0%	± 10%
Absolute Average Percent Difference			0%	± 10%

LINEAR REGRESSION ANALYSIS
y=mx+b (where x=calculated concentration, y=indicated concentration)

<u>SO₂</u>		<u>LIMITS</u>
Correlation=	1.0000	≥ 0.995
m (Slope)=	0.9986	0.90-1.10
b (Intercept % of FS)=	0.0477	± 3% F.S.

AENV Standards		SO₂ Analyzer	
Audit Calibrator		Make/Model	<u>Themro 43i</u>
Make/Model	<u>R&R MFC 201</u>	Serial/AMU Number	<u>1623</u>
Serial/AMU Number	<u>1690</u>	Last Calibration Date	<u>January 31, 2017</u>
SO ₂		Full Scale (ppm)	<u>1.0</u>
SRM Gas Cylinder No.	<u>CAL016625</u>	Expiry Date	<u>January 5, 2019</u>
Cylinder Conc. (ppm)	<u>98.07</u>		

COMMENTS: Analyzer verified prior to audit

Auditor: Shea Beaton Date: February 14, 2017
 Operator Signature: [Signature] Location: McIntyre Center Edmonton

Company Maxxam Operator: Mike

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Enviroics 2000</u>	Make/Model	<u>Bios Defender 530</u>
Serial Number	<u>1991</u>	Serial Number	<u>HI148944 Lo 152019</u>
Last Verification Date	<u>March 31, 2016</u>	Temperature (°C)	<u>24.5</u>
NO Cylinder S/N	<u>EY0000597</u>	Barometric Pressure	<u>699</u>
NO [PPM]	<u>49.0</u>	NOx [PPM]	<u>49.0</u>
Expiry Date	<u>December 8, 2019</u>		

Dilution Flow (sccm)		
Pt. #1 <u>4902</u>	Pt. #2 <u>4935</u>	Pt. #3 <u>4957</u>
Gas Flow (sccm)		
Pt. #1 <u>79.3</u>	Pt. #2 <u>38.7</u>	Pt. #3 <u>19.4</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4976	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4981	79.3	0.7801	0.7801	0.7898	0.0000	0.7898	1%	1%
4972	38.7	0.3814	0.3814	0.3841	0.0002	0.3843	1%	1%
4976	19.4	0.1910	0.1910	0.1913	0.0003	0.1916	0%	0%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS *y=mx+b (where x=calculated concentration, y=indicated concentration)*

NO	LIMITS	NOx
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 1.0130	0.90-1.10	m (Slope)= 1.0129
b (Intercept % of FS)= -0.1190	± 3% F.S.	b (Intercept % of FS)= -0.1029

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4981	0.000	0.0000	0.7925	-0.0001	0.7924	NO ₂	% Diff. Limit
4981	0.400	0.5347	0.2578	0.5279	0.7857	-1%	± 10%
4981	0.200	0.2490	0.5435	0.2478	0.7913	0%	± 10%
4981	0.090	0.1090	0.6835	0.1095	0.7927	1%	± 10%
Absolute Average Percent Difference						0%	± 10%

LINEAR REGRESSION ANALYSIS *y=mx+b (where x=calculated concentration, y=indicated concentration)*

NO₂	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9864	0.90-1.10
b (Intercept % of FS)= 0.1136	± 3% F.S.

AENV Standards	NO_x Analyzer
Audit Calibrator	Make/Model <u>Thermo 42i</u>
Make/Model <u>Thermo 146i</u>	Serial/AMU Number <u>1868</u>
Serial/AMU Number <u>1809</u>	Last Calibration Date <u>March 15, 2017</u>
SRM Gas Cylinder No. <u>CAL018140</u>	Full Scale (ppm) <u>1.0</u>
Cylinder Conc. (ppm) <u>48.79</u>	Cylinder Gas Expiry Date <u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton Date: March 16, 2017

Operator Signature: [Signature] Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2016-438CGA

Company: Maxxam **Operator's Name:** Chris

Cylinder #: EY0000597 Concentration PPM: 50.4 Tolerance(%) 1.0 Certified By: Praxair

Expiry Date: December 8, 2019

Reference Calibrator and Gas:

Make/Model: Thermo 146i

Serial Number: AMU 1809

Last Verification Date: January 26, 2017

Gas Type: SO2 Conc. 98.07

Cylinder Number: CAL016625

Expiry Date: January 5, 2019

Flow Measurement Device:

Make/Model: Bios Befiner 220

Serial Number: AMU1941

Temp. °C: 24.4

B.P. 704.7

Reference Analyzer:

Make/Model: Themro 43C Serial/AMU Number: AMU 1623

Instrument Settings: Zero: 9.5 Span: 1.023 Range: 1.0

Last Calibration: Date: 25-Jan-17 C.F. 1.000 Done By: SB

Calibrator Flows (scm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
4923	0.0	0.000	0.01642	60.917	50.8
4916	80.7	0.834	0.01642	60.917	50.8
4902	40.3	0.416	0.00822	121.638	50.6
4916	19.9	0.206	0.00405	247.035	50.9
Average Cylinder Concentration:					50.7

Previous Stated Concentration PPM: 50.4

Percent variance from Stated: 0.7

- Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:** _____
- < =5% Outside Manufacturer Tolerance. Use manufacturers concentration _____
- > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder _____

Auditor: Shea Beaton

Operator Signature: _____

Date: January 26, 2017

Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2015-338CGA

Company: Maxxam **Operator's Name:** Limin Li
Cylinder #: BLM002508 **Concentration PPM:** 10.2 **Tolerance(%)** 2 **Certified By:** Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
 Serial Number: AMU1690
 Last Verification Date: March 31, 2015
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015106

Flow Measurement Device:

Make/Model: Bios DC2
 Serial Number: AMU 1659
 Temp. °C: 23.0 C
 B.P. 689 mmhg

Reference Analyzer:

Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 14.5 Span: 1.035 Range: 0.1
 Last Calibration: Date: Mar 31/15 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.0000	0.0000	0.0000
5080	38.2	0.0725	0.00752	132.984	9.6
5078	17.9	0.0340	0.00353	283.687	9.6
5066	9.1	0.0170	0.00180	556.703	9.5
Average Cylinder Concentration:					9.6

Previous Stated Concentration PPM: 10.2

Percent variance from Stated: 6.0

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:** _____
 <=5% Outside Manufacturer Tolerance. Use manufacturers concentration
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Al Clark
 Operator Signature: *Al Clark*

Date: March 31, 2015
 Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-091CGA

Company: Maxxam Operators name: Chris Wesson
Cylinder #: LL86139 Conc CH4 (PPM) 599/211 Tolerance (%) 0.5 Certified By: Praxair

Reference Calibrator and Gas:

Make/Model R&R MFC 201
Serial Number AMU 1698
Last Verification Date January 18, 2016
Gas Type CH4 Conc. 999.2
Cylinder Number D751932
Gas Type C3H8 Conc. 246.5
Cylinder Number XF0037998

Flow Measurement Device:

Make/Model Bios DC-2
Serial Number Bios D
Temp. °C 23
B.P. 599mmHg

Reference Analyzer:

Make/Model Thermo 55C Serial/AMU Number: 1643
Instrument Settings Zero: NA Span: NA Range: 20.0
Last Calibration: Date: 18-Jan-16 C.F. 1,000 Done By: SB

Calibrator Flows (scm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH4	C3H8			CH4	C3H8
2583	0.00	0.00	0.00	0.02145	46.621	597	213
2635	56.52	12.80	12.59	0.02145	46.621	597	213
2592	19.72	4.54	4.49	0.00761	131.440	597	215
2584	9.69	2.25	2.24	0.00375	266.667	600	217
Average Cylinder Concentration:						598	215

	<u>CH4</u>	<u>C3H8</u>
Previous Stated Concentration PPM:	<u>599</u>	<u>211</u>
Percent variance from Stated:	<u>0.2</u>	<u>1.9</u>

Cylinder gas tolerances based on CH4 only

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: _____
 <=5% Outside Manufacturer Tolerance. Use manufacturers concentration C3H8 manufacturers tolerance 1.1%
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton Date: January 19, 2016
Operator Signature: _____ Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2013-298CGA

Company: Maxxam **Operators name:** Theo
Cylinder #: LL19638 **Conc CH4 (PPM)** 880/304 **Tolerance (%)** 2 **Certified By:** Praxair

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>R&R MFC 201</u>			Make/Model	<u>Bios DC2</u>
Serial Number	<u>AMU 1690</u>			Serial Number	<u>AMU 1659</u>
Last Verification Date	<u>October 17, 2013</u>			Temp. °C	<u>21.0 C</u>
Gas Type	<u>CH4</u>	Conc.	<u>999.2</u>	B.P.	<u>706 mmhg</u>
Cylinder Number	<u>D751932</u>				
Gas Type	<u>C3H8</u>	Conc.	<u>246.5</u>		
Cylinder Number	<u>XF0037998</u>				

Reference Analyzer:
Make/Model Teco 55C **Serial/AMU Number:** 1625
Instrument Settings **Zero:** N/A **Span:** N/A **Range:** 20
Last Calibration: **Date:** Oct 17/13 **C.F.** 1.000 **Done By:** Al Clark

Calibrator Flows (scm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH4	C3H8			CH4	C3H8
3500	0.0	0.04	0.00	0.01481	67.534	889	309
3505	51.9	13.16	12.58	0.01481	67.534	889	309
3487	22.2	5.64	5.43	0.00637	157.072	886	310
3458	10.8	2.80	2.73	0.00312	320.185	897	318
Average Cylinder Concentration:						890	312

	CH4	C3H8
Previous Stated Concentration PPM:	<u>880</u>	<u>304</u>
Percent variance from Stated:	<u>1.2</u>	<u>2.7</u>

Cylinder gas tolerances based on CH4 only

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:** _____
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Al Clark **Date:** October 17, 2013
Operator Signature: *Al Clark* **Location:** McIntyre Center Edmonton

***APPENDIX III
REPORT CERTIFICATION FORM***

Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
YES	NA
Company Name (if applicable)	Industrial Operation Name (if applicable)
Peace River Area Monitoring Program Committee	Three Creeks 842b Station
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
Wunmi Adekanmbi	Project Manager, Customer Service, Air Services
Is an External Party Certifying the Report? (If 'Yes', fill in the fields below for the external person.)	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Name of External Person Certifying the Report (Last, First, Middle)	Position / Title of External Person Certifying the Report
NA	NA
Company Name for the External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report
NA	NA

I certify that I have reviewed and verified the submitted report. I also certify that the report presented with this certification form is complete, accurate and representative of the monitoring results and timeframe.



Signature of the Representative of the Person Responsible / External Person Certifying the Report

December 20, 2017





Report Issued Date (dd-mm-yyyy)

***APPENDIX IV
DATA VALIDATION CERTIFICATION FORM***



Validation Certificate Form

Client: <u>Peace River Area Monitoring Program Committee</u>	Project #: <u>8449-2017-11-80-C</u>
Site: <u>Three Creeks 842b Station</u>	Contact: <u>Karla Reesor</u>

Level 0 Preliminary Verification	<u></u>	Date <u>December 06, 2017</u>
Level 1 Primary Validation	<u></u>	Date <u>December 06, 2017</u>
Level 2 Final Validation	<u></u>	Date <u>December 20, 2017</u>
Level 3 Independent Data Review	<u></u>	Date <u>December 20, 2017</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

Notes
The Post-Final Validation step serves to re-evaluate the data that errors or omissions are discovered and/or suspected after the initial submittal of data. This validation is performed on an annual basis.